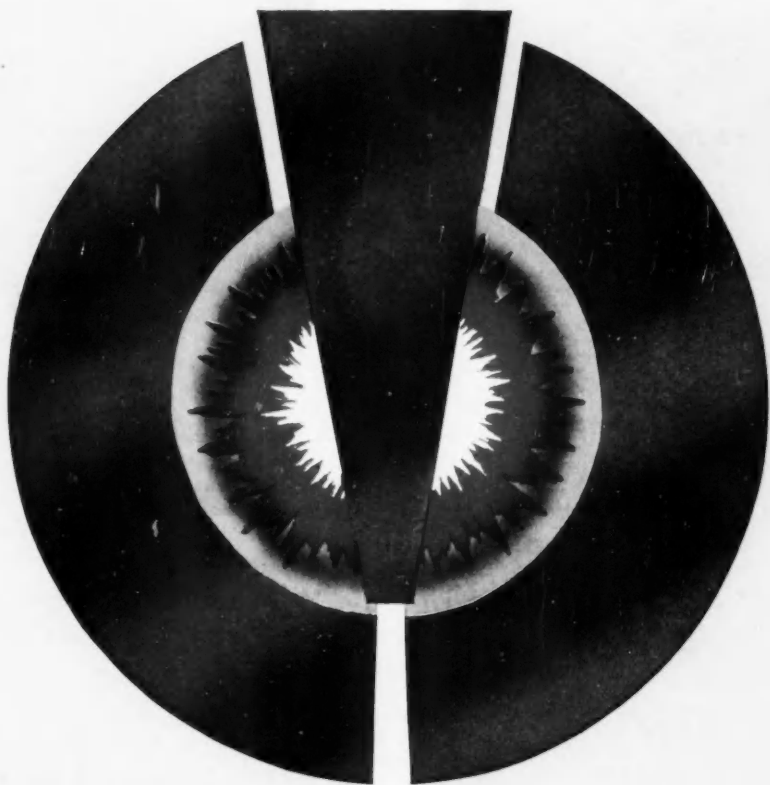


AUTOMOTIVE INDUSTRIES

OCTOBER 15, 1949



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Huge Equipment Buying Program Ahead

Martempering Diesel Cylinder Liners

Dodge Announces B-2 Truck Series

Simplified Production of Front Fenders

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A complete line of

NEW Heald Hi-Frequency RED HEADS

Give you more speed, economy and precision
in small hole grinding



This Heald Model 180 Centerless Internal Grinder is equipped with a Hi-Frequency Red Head wheelhead, for faster, more economical grinding of small bore bearing races.



**PRECISION INTERNAL AND
SURFACE GRINDERS**

**PRECISION BORE-MATIC
FINISHING MACHINES**

THE HEALD MACHINE COMPANY
Worcester 6, Mass.

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● The necessity for increasing wheel speed to obtain proper surface feet per minute in small hole grinding is generally enough reason for manufacturers to consider the use of high-frequency equipment. But when this demand is coupled with requirements of speed, economy and efficiency, most people naturally are turning to Heald for the answer.

New Heald Hi-Frequency Red Head Wheelheads are designed to operate at speeds well in excess of the normal belt driven type giving you the extra surface feet per minute required.

Heald Hi-Frequency Red Heads permit extremely high speed and virtually vibrationless operation, thereby effectively increasing the precision characteristics of the finished product.

The application of Heald Hi-Frequency equipment is not confined to the grinding of very small holes alone. Some manufacturers have found the use of Hi-Frequency heads to be extremely satisfactory for larger size work. But large or small, the application of high-frequency equipment is a specialized proposition. Why not let your nearest Heald representative discuss your particular high speed, high accuracy grinding requirements with you?

1513



the
195-GKA
SIX

WAUKESHA GASOLINE ENGINES

(COMMERCIAL TYPE)

for All Heavy-Duty Power-Driven Machinery

WAUKESHA MOTOR COMPANY • WAUKESHA, WIS.

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WAUKESHA

find out
HOW
and
WHY...

GET BULLETIN 1513

Find out all about this new 6-cylinder "commercial" type Waukesha Engine that develops 125 peak hp. on 75 octane gasoline... and has a maximum permissible speed of 3000 rpm.

Waukesha Model 195-GKA has overhead valves with Stellite-faced exhaust valve and Stellite exhaust seat inserts; aluminum pistons; counterbalanced hardened crankshaft with vibration damper; full pressure oiling; full floating piston pins; copper-lead-babbitt precision bearings and Waukesha-built governor. Mountings may be provided for all standard accessories—air brake compressor, fuel pump, oil filter, air cleaner, either battery or magneto ignition, electric starting and lighting equipment. Bore $4\frac{1}{8}$ -in., stroke 4-in., displacement 320 cu. in. Get Bulletin 1513.

WAUKESHA MOTOR COMPANY
WAUKESHA, WISCONSIN
TULSA • LOS ANGELES
NEW YORK

Frameless tanker built of Mayari R by Advance Auto Body Works. Deadweight reduction has permitted 700-gal increase in payload. Tanker has full-oscillating fifth wheel to fully absorb the twisting action of tank. The 4-in. steel tubing flow lines and valves permit high-speed gravity dump.



700 EXTRA GALLONS RIDE FREE

Frameless construction combined with the use of Mayari R low-alloy, high-strength steel has eliminated several hundred pounds of surplus deadweight while adding 700 gallons of additional payload capacity to the modern tanker pictured above.

Built by Advance Auto Body Works of Los Angeles for the Union Oil Company, this five-compartment, 5720-gal job is designed to carry the maximum legal payload on four axles. The self-supporting tank construction has done away with some of the deadweight by eliminating the need for conventional frame members. The remainder of the saving is accounted for by the use of 12-gage Mayari R low-alloy, high-strength steel instead of 10-gage or heavier carbon steel in the shell, baffle plates and heads of the tank.

Because of its superior properties and relatively low cost, Mayari R has been widely used for reducing

deadweight in many types of trucks, trailers, buses and other commercial vehicles. It has made substantial increases in payload capacities and at the same time has reduced the high cost of maintenance for fleet operators from New England to Southern California.

A new booklet dealing with the properties, workability, and applications of Mayari R is yours for the asking. Write or phone for a copy.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation

Export Distributor: Bethlehem Steel Export Corporation



Mayari R *makes it lighter... stronger... longer lasting*

AUTOMOTIVE INDUSTRIES

October 15, 1949

Published Semi-Monthly

Vol. 101, No. 8

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Cable Address.....Autoland, Philadelphia

Member: Audit Bureau of Circulations

AUTOMOTIVE INDUSTRIES is a consolidation of The Automobile (weekly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907; and the Horseless Age (weekly), founded in 1905, May, 1918.

AUTOMOTIVE INDUSTRIES, October 15, 1949

AUTOMOTIVE INDUSTRIES, Vol. 101, No. 8. Published semi-monthly by Chilton Co., Chestnut & 56th Sts., Phila. 39. Entered as Second Class Matter October 1, 1925, at the Post Office at Philadelphia, Pa.: Under the Act of Congress of March 3, 1879. In case of Non-Delivery Return Postage Guaranteed. Subscription price: United States, Mexico, United States Possessions, and all Latin-American countries, \$2.00 per year. Canadian and Foreign \$5.00 per year; single copies, 25 cents, except Statistical Issue (Mar. 15th), \$1.00.

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Many manufacturers find that in Tourek's wide range of standard Ball Joints there is a type and size which meets their exact requirements. You, too, can simplify the design and improve the performance, as well as reduce the cost of your products by specifying standard Tourek Ball Joints... Our large stock assures prompt delivery.

Or, if you are planning a new product calling for special Ball Joint design, call upon Tourek for experienced advice.

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Write for Tourek's 16-page illustrated catalog, containing complete specifications on 12 standard types in 54 sizes, as well as data on special types.

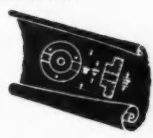


Your screw machine product requirements, when produced at Tourek, are the result of coordinated engineering know-how, the latest in modern high-speed 6-spindle automatics, skilled operators, plus 28 years of experience.

Your production parts, from 1/16" to 2 1/2" are made with the utmost precision and delivery is assured according to schedule.

SCREW MACHINE PRODUCTS

An inquiry on your screw machine product needs is invited. Send a blueprint or sample for quotation.



J. J. TOUREK MFG. CO.
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MAKERS OF QUALITY
SCREW MACHINE PRODUCTS



Newest Victor Gasket Designs for High Compression Engines

VIC-2-BEAD



Dual-beaded thin metal. Proved in both L-head and Valve-in-head engines. Compressed thickness to .020

VIC-2-BEAD is the first thin metal gasket to effectively seal both types of engine heads at high compression ratios. It already has the acceptance of the automotive industry.

Sealing with VIC-2-BEAD does not depend on contact with the flat surface of the gasket. Seal is made by the precisely blended, embossed dual-beading around all combustion and coolant openings. When compressed, the beading creates a wave spring action which maintains maximum tightness from within. Sealing forces are concentrated where needed most, without danger of cylinder wall distortion. Once studs or cap screws are tightened to specified torque, retightening is unnecessary due to VIC-2-BEAD's sustained live sealing action.

VIC-2-FOLD



Thinnest practical metal-encased asbestos construction. Compressed thickness on engine .040

VIC-2-FOLD meets the requirements of modern high compression engines with the thinnest practical construction for a compressible metal-asbestos gasket. Combines the high breakdown resistance of steel, and the corrosion resistance of copper. Bottom steel layer is formed up in combustion openings to overlap the asbestos filler and copper top layer. The copper top layer is formed down into all waterways, and overlaps the bottom layer.

VIC-2-FOLD excels standard construction for flexibility, and has adequate compressibility for positive sealing in all applications. It has all desirable features of a general purpose gasket, equally suited for Valve-in-head and L-head engines, in gasoline or diesel service.

COMPLETE TECHNICAL DATA on these newest Victor designs supplied on request. Ask your Victor Representative or write today. Victor Mfg. & Gasket Company, P. O. Box 1333, Chicago 90, Illinois.

Manufacturers of SEALING PRODUCTS Exclusively

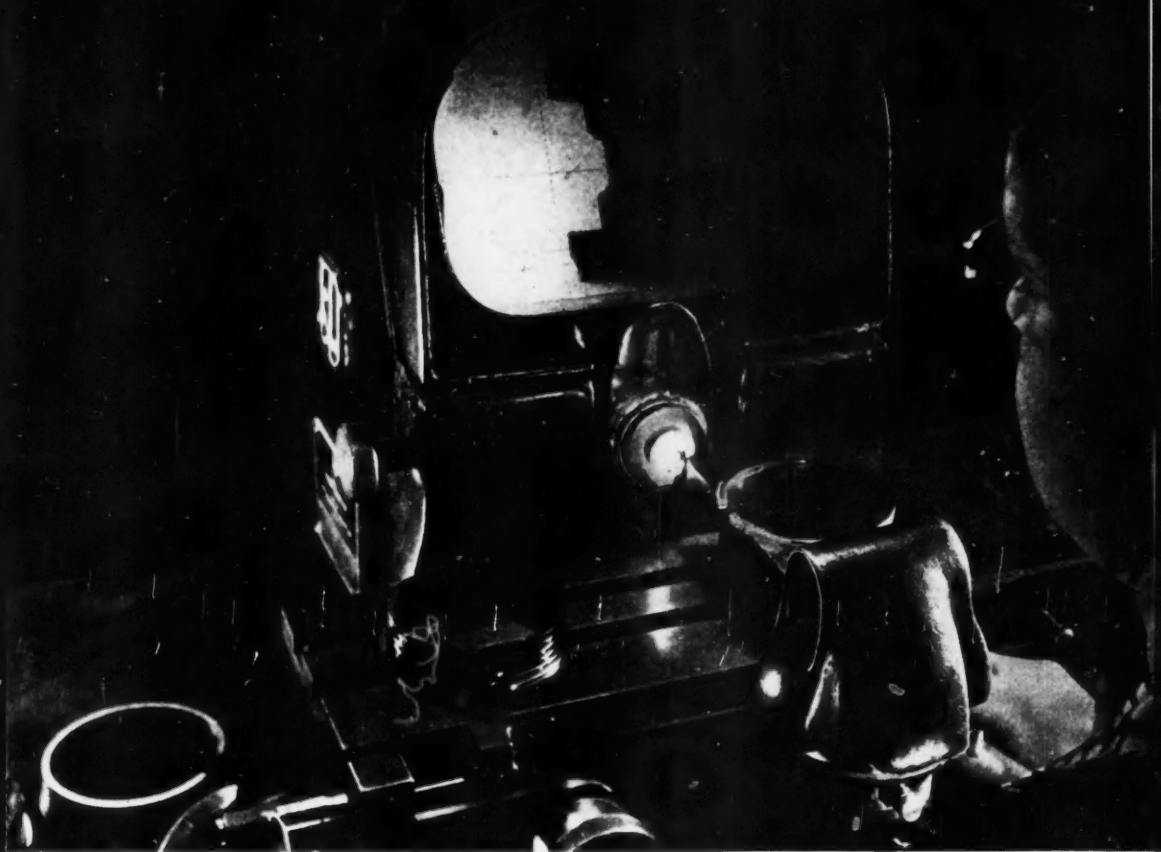
VICTOR

GASKETS • OIL SEALS



*The Greatest
Name in the
Gasket Industry*

ONE OF THE RESOURCES BEHIND A UNIQUE POLICY



Profile — OF A PISTON RING

This "Shadowgraph", or optical comparator, enables a Muskegon inspector to study and measure piston rings at a magnification of 31 diameters.

In the photograph the inspector is checking the profile or contour of a grooved and channeled oil ring. At the same time, by means of a transparent chart, she can measure the width of the lands and depth of the channel.

Because of the size of the magnified image, such measurements are more accurate than those made with ordinary micrometers or depth gages.

Complete facilities for inspection are but one of the rich resources, in both plant and personnel, that stand behind Muskegon's *unique policy*.

Policy

"It is Muskegon's firmly established policy to sell exclusively to manufacturers (1) for installation as original equipment and (2) for resale for service purposes."

MUSKEGON Piston Rings

MUSKEGON PISTON RING CO.
MUSKEGON, MICHIGAN
PLANTS AT MUSKEGON AND SPARTA

"THE ENGINE BUILDERS' SOURCE"

Get a line on better automotive tubing



For better connections with automotive tubing, call for Bundyweld*.

Bundyweld's made-to-order to take vibration, shock, and pressure in fuel lines, hydraulic brake lines and pressure lines . . . *that's why it's found in 95% of today's cars!*

For Bundyweld is double-walled from a single strip . . . extra rugged, strong and sturdy. It is extremely ductile, and can be bent without fear of collapsing or weakening structurally.

Close tolerances are assured in Bundyweld Tubing, and the ease with which it can be machined or fabricated helps to cut production time and to lower production costs.

Get a line on this low-cost outstanding tubing for your tubing needs. Contact your near-by Bundy distributor listed below, or write direct to: **Bundy Tubing Company, Detroit 14, Michigan.**

BUNDY TUBING

★ ★ ★  ★ ★ ★
ENGINEERED TO YOUR EXPECTATIONS
REG. U.S. PAT. OFF.



WHY BUNDYWELD IS BETTER TUBING

1 Bundyweld Tubing, made by a patented process, is entirely different from any other tubing. It starts as a single strip of basic metal, coated with a bonding metal.

2 This strip is continuously rolled twice laterally into tubular form. Walls of uniform thickness and concentricity are assured by close-tolerance, cold-rolled strip.

3 Next, a heating process fuses bonding metal to basic metal. Cooled, the double walls have become a strong ductile tube, free from scale, held to close dimensions.

4 Bundyweld comes in standard sizes, up to 4" O.D. in steel (copper or tin coated), Monel or nickel. For tubing of other sizes or metals, call or write Bundy.

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BUNDYWELD NICKEL AND MONEL TUBING IS SOLD BY DISTRIBUTORS OF NICKEL AND NICKEL ALLOYS IN PRINCIPAL CITIES.



Cars may come and
 Cars may go ... but
Hyatts go on forever

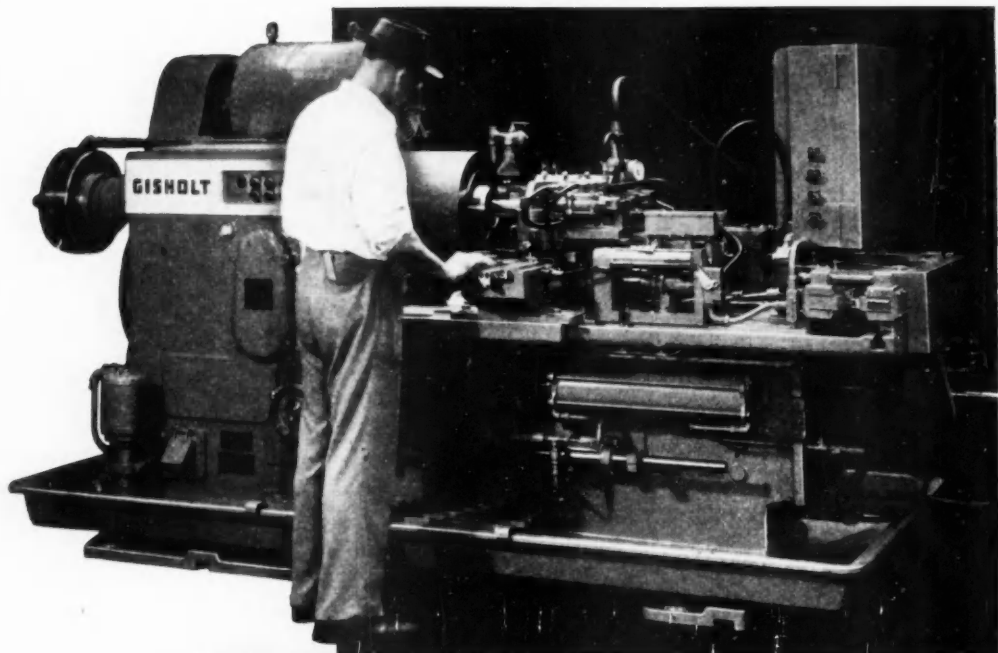
Out of sight—out of mind—millions of Hyatt Roller Bearings are contributing to the quiet, smooth-rolling comfort of most of the motor cars, buses and trucks on the roads today.

And as the automotive industry has progressed, so has Hyatt matched this progress with its advanced research and experi-

mental testing—newer bearing types and methods of production.

Hyatt made its first roller bearings for motor cars in 1892. Hyatt is still first in preference—tested and proved by enduring performance. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.; Detroit, Michigan.

HYATT ROLLER BEARINGS



HOW **8** SIMPLIMATICS

cut machine time 50%
cut man-hours 75%

The way you can slash costs with the Gisholt Simplimatic often surprises some of the most experienced production men.

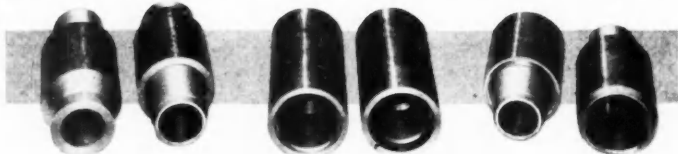
Here's a big shop which found that 8 Simplimatics could take over the job done on 16 other machines. And it takes only 4 operators instead of 16 to turn out the volume of parts required.

Not the least in the cost picture is the machine itself. For the basic Simplimatic

design permits you to individualize the machine to a high degree to solve many different problems. Thus, for many jobs you can have all the advantages of a special machine merely with special tooling. Yet it's all done on a Standard Simplimatic—at far lower cost.

The importance of lower costs these days makes it important for you to get all the facts about Simplimatic Automatic Lathes.

The GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface finishing and balancing of round and partly round parts. Your problems are welcomed here.



In producing these tool joint pins and boxes, the 8 Simplimatics work in pairs with fully automatic operation: one man can easily tend two machines.

Ask about the many different arrangements possible on the Standard Simplimatic with platen table, vertical head, etc.

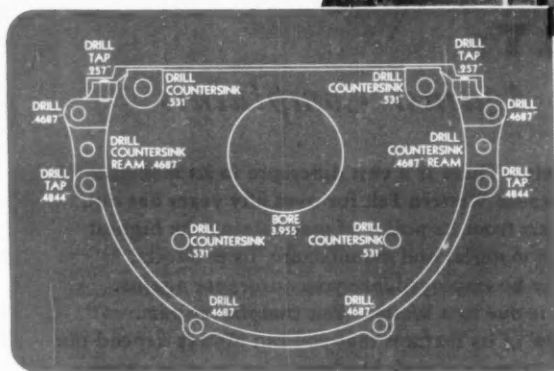
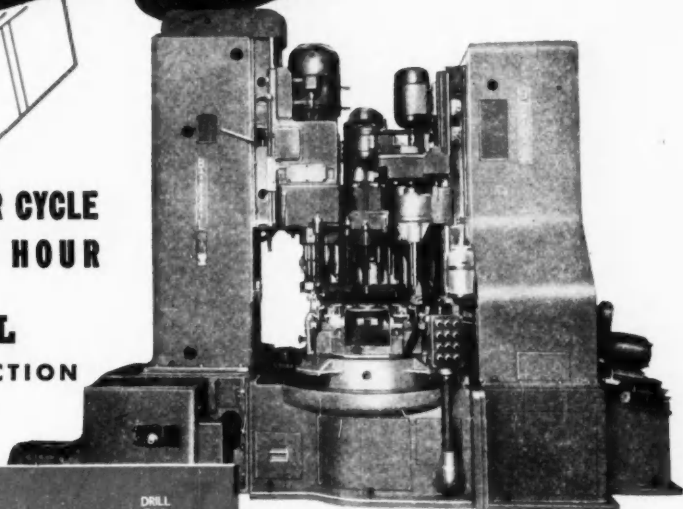
GISHOLT MACHINE COMPANY, Madison 10, Wisconsin

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25 OPERATIONS PER CYCLE
80 PIECES PER HOUR

with
BARNESDRIL
UNIT-PRODUCTION
MACHINING



Quick investment return — cutting production costs — reducing floor space and equipment — these ever-present production problems can be met in a single "package" with **BARNESDRIL** Unit-Production Machining.

On this job, drilling, boring, reaming, countersinking and tapping operations are combined into a single automatic cycle, with

a net output of 2000 holes or 80 complete pieces per hour. Unit costs are greatly reduced. The operator is relieved of fixture changes and individual piece handling, and is required only to load and start the cycle.

BARNESDRIL Unit-Production Machining has wide application to many metal removal operations. A **BARNESDRIL** engineer will show you the potential increase in savings and efficiency which can be obtained on your work. Send blueprints for proposal, and ask for a copy of Bulletin B-1509.



BARNES DRILL CO.

850 CHESTNUT STREET ROCKFORD, ILLINOIS U.S.A.

Automatic Grinding OF LARGE CASTINGS

in
1/7th
OF THE
TIME!



NEW No. 936 Vertical Spindle BESLY Rotary Surface Grinder

Per-piece grinding time cut from 96 to 13 minutes, a 7-fold improvement—Automatic operation for savings on costly expert labor—Modern design to cut maintenance—A minimum of pre-setting!

These are the spotlighted results achieved by this new Besly grinder, now used by a Texas company in grinding gates for high pressure oil lines. Tests show this grinder equally efficient on fifth wheel castings, small gas engine bases, fluid drive transmission housings and many other types of work.

Here again, Besly experience in grinder design, engineering and manufacture has served to produce improved grinding in less time and at lower cost. Beating high costs today on production grinding means modern grinding equipment, built by experts to meet your specific needs.

When you call on Besly you get the benefit of more than 50 years accumulated experience—the kind of help that means more production profit at lower cost on grinding.

CHECK THESE PRODUCTION BOOSTING, MONEY-SAVING FEATURES OF THE No. 936

- Vertical, Single Spindle—using 42" diameter abrasive ring above a rotating table.
- Entire Spindle Assembly—raised or lowered by lead screw.
- Quick, Easy Loading Table—slotted for secure holding of work with bolts. Operates at any speed from 1 to 8 1/4 RPM.
- Automatic Operation—after table is loaded and controls adjusted.
- Pendant Control Box—within easy reach of operator.
- Motors, Bearings, Cylinders—all designed to operate at highest efficiency with minimum power and maintenance requirements.



TITAN WHEELS
Here's a valuable source of information on modern grinding wheels and abrasives with all the facts on Besly Titan Steel-bonds to save "down time." Write for your copy today!

Maybe GRINDING is the Better Way... Better Check with

**BESLY GRINDERS AND ACCESSORIES
BESLY TAPS • BESLY TITAN ABRASIVE WHEELS**

BESLY

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Solve THESE DESIGN PROBLEMS

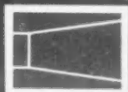
ON POWER TRANSMISSION DRIVES
with TAPER ROOT INVOLUTE SPLINES



PARALLEL KEY HUBS REQUIRE SUBSTANTIAL LUGS. THESE LUGS ARE SUBJECT TO QUICK WEAR AND REDUCED HUB LIFE.



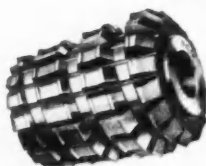
INVOLUTE HUBS REQUIRE LUGS ABOUT 1/3 THOSE USED FOR PARALLEL KEY DESIGN, ADDING ROOT CONTACT AREA.



MATING HUB LOCATES ON THE TAPER. INVOLUTE FORM IS SELF-CENTERING, EQUALIZED LOAD STRESSES AND BEARING.



INVOLUTE HOB CUTS ANY STANDARD P.D. OF SAME PITCH, AND ANY CONVENTIONAL INCLUDED ANGLE.



Write: By using Taper Root Involute Splines, power transmission drives can be produced more practically, at a cost that permits a profit.

Write today for information on how to produce them easily, rapidly and economically with Barber-Colman Hobs and Machines. Address requests for estimates to Department 3642.



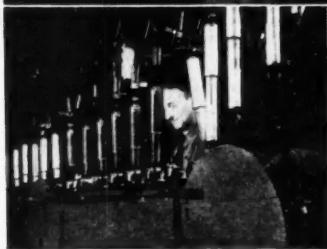
- 1 SHORT LENGTH, SOLID FIT**
Taper Root Involute Splines seldom require a length more than equal to the pitch diameter, which is sufficient for carrying any potential load.
- 2 RESIST TORSIONAL STRESS**
Taper Root Involute Splines offer about 50% more root contact area than parallel key mounts. Tests prove the strength of this Design equals that of a solid shaft, slightly larger in diameter than the root diameter of the spline.
- 3 EASY MACHINING, LOW TOOLING COST**
Taper Root Involute Spline Hobs have more teeth, remove less metal per tooth space, and run at faster RPM's than parallel key hobs. Tool life is longer because clearance lugs are reduced.
- 4 LOCATING SHOULDERS ELIMINATED**
Taper Root Involute Splines locate against the taper and are thereby self-centering. Equalized bearing and stresses result on all teeth.

Barber-Colman Company

GENERAL OFFICES AND PLANT, 3642 LOOMIS STREET, ROCKFORD, ILLINOIS, U.S.A.

Houdaille-Hershey makes better shock absorbers at lower cost with J&L free-machining **ELECTRICWELD** STEEL TUBING

J&L STEEL



(Above) Multiple spindle broaching machine at the Houde Engineering Division of Houdaille-Hershey Corporation that machines the inside diameter of J&L ELECTRICWELD Tubing to 1/1000" tolerance.

(Left) Aeroplane-type shock absorbers on the production line at the Houde Engineering Division, Houdaille-Hershey Corporation, Buffalo, N. Y.

When production runs into thousands of units daily, every possible saving in material and labor costs in each shock absorber is vital to efficient manufacturing. Houdaille-Hershey Corporation, Buffalo, New York, reduced manufacturing costs when it changed from more expensive cold-drawn tubing to J&L free-machining ELECTRICWELD Tubing for the main cylinder of precision-built hydraulic shock absorbers.

This special J&L tubing is made from resulphurized, open-hearth steel. The resulphurizing imparts the de-

sired free-machining quality required by Houdaille-Hershey for broaching the interior surface of the cylinders with uniform precision to a tolerance of 1/1000 of an inch.

Because J&L controls every step in the manufacture of ELECTRICWELD Tubing from raw materials to finished product, it can give you the exact grade of steel you need to help you make a better product, faster, and at a lower cost.

If you use tubing in the manufacture of your product investigate J&L ELECTRICWELD Tubing. Write today

for your copy of our new booklet: "J&L ELECTRICWELD TUBING for more strength with less weight."

Jones & Laughlin Steel Corporation
430 Jones & Laughlin Building
Pittsburgh 19, Pa.

Please send me your booklet: "J&L ELECTRICWELD TUBING for more strength with less weight."

NAME _____
TITLE _____
COMPANY _____
ADDRESS _____

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY and JALLOY (hi-tensile steels).

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

Bendix Products

CREATIVE ENGINEERING

GEARED TO QUANTITY PRODUCTION

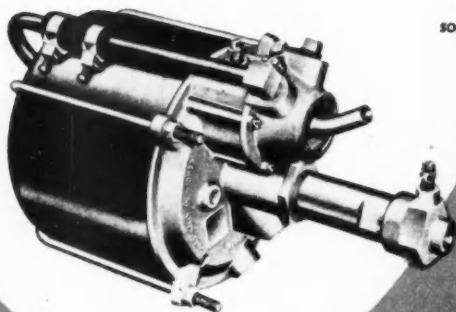
HYDROVAC

THE POWER BRAKE PREFERRED ABOVE ALL OTHERS!

More than two million installations are certainly undeniable proof of any product's popularity. In the field of power braking it means that one—the Bendix Hydrovac—is preferred above all others. Such overwhelming acceptance by the men who service, drive and own the nation's trucks is impressive enough in itself. It further

suggests, however, that Hydrovac* power braking might very profitably be included as original equipment by most manufacturers. If you are interested in taking advantage of this great pre-sold market, write the factory direct for details on Hydrovac—the undisputed leader in power braking.

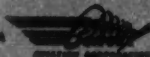
*REG. U.S. PAT. OFF.



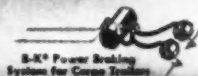
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DIVISION of**

SOUTH BEND 30, INDIANA

Expert Sales: Bendix International Division,
72 Fifth Avenue, New York, N. Y.



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Emergency
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**S-K® Power Braking
System for Cargo Trucks**



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Power Steering**

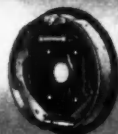
**BUILDERS
OF THE BASICS
OF BETTER
MOTOR VEHICLES**



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Clutch and Gear Shift
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Passenger Cars**

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**AUTOMOTIVE
INDUSTRIES**

Reg. U. S. Pat. Off.

The Authoritative Technical and News Magazine
That Gives Comprehensive Coverage, Domestic
and Foreign, of These Industries:

Passenger Car
Truck
Bus
Aircraft
Tractor

Engine
Body
Trailer
Road Machinery
Farm Machinery

Parts and Components
Accessory
Production Equipment
Service Equipment
Maintenance Equipment

High Spots of This Issue

Greater Equipment Buying Ahead in the Automotive Industries

The great automotive industries for years without exception the largest single market for machine tools, has increased its tempo of product design improvement. New automatic transmissions, higher compression engines, disk brakes and other refinements to come, hold increasingly untold opportunities for machine tool manufacturers, as indicated in the article starting on page 27.

Metals In Automobiles

Disregarding iron and steel used in constructing the modern passenger car, lead averages about 35 lb per car, and tops the list of non-ferrous metals and alloys used. The various applications of lead are here described by Kempton H. Roll of the Lead Industries Association, page 30.

Machining and Martempering 100 Diesel Cylinder Blocks per Hour

The Detroit Diesel Engine Division of General Motors Corp. has in full operation a completely self-contained, mechanized line for finishing cylinder liners. It features a high production application of the Martempering process for controlled heat treatment. Various other advanced practices in this cylinder liner department are also revealed in this account, beginning on page 32.

356 Models in Dodge B Series Truck Line

Here are facts and figures on introduction of the new B-2 Series "Job-Rated" line of Dodge trucks. The line includes basic conventional chassis models—Power-Wagon, Dual Purpose models, C-O-E, C-O-E Dual Purpose models, school bus line and Route-Vans. For the complete story turn to page 45.

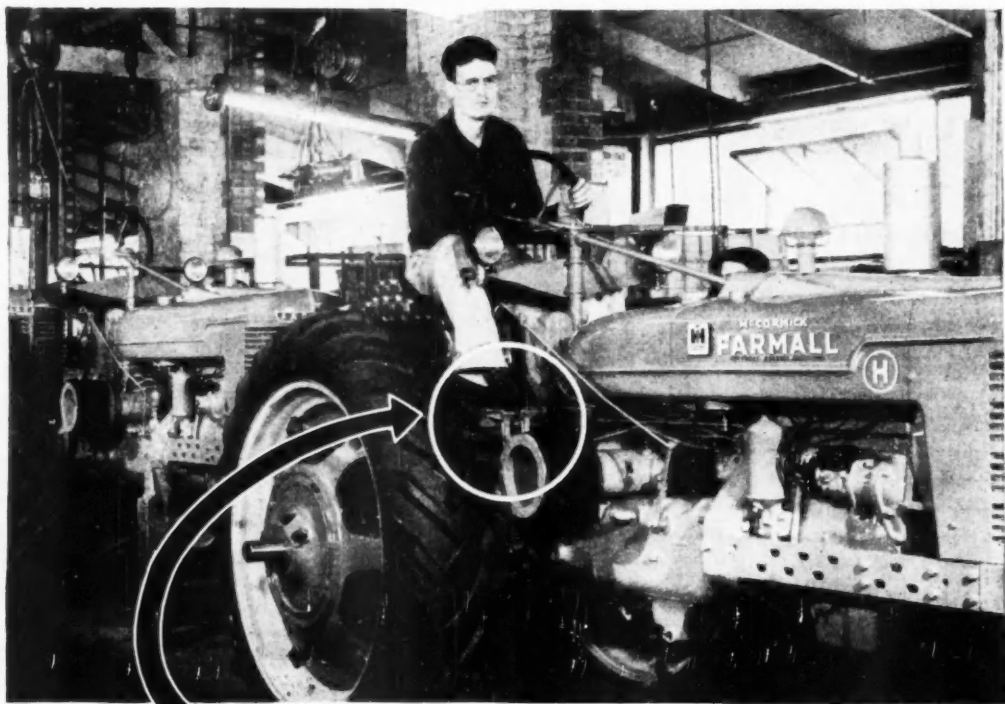
Buick Converts to Transfer Line for Water Pump Bodies

The most recent transfer line placed in regular production at Buick is an integrated 12-station Greenlee unit for making completely the water pump body. How this integrated machine simplifies former individual setups requiring some 10 machines is the subject discussed, page 40.

18 New Product Items And Other High Spots, Such As:

31st National Metal Show and Exposition; progress report on die-cast body parts; views on devaluation as reflected by the automobile industries of the U. S., England, and Canada; tractor highlights; an improved method of size control for external grinding; and the emphasis on turbine power evident at Britain's Aircraft Show.

*News of the Automotive Industries, Page 17
For Complete Table of Contents, See Page 3*



Quick Steel

Keeps Harvester Production Moving

At 3:15 P.M. on April 11, International Harvester Company's Farmall Works at Rock Island, Illinois called the Ryerson Plant in Chicago. They wanted a thousand pounds of cold finished hexagons, $1\frac{1}{2}$ " x 10 to 12 feet. The bars were urgently needed for a brake pedal installed at an early stage of Farmall tractor assembly.

Marked "Rush" by the Ryerson service man who received it, the order was filled—the steel loaded and on its way at 5:05 P.M.—less than two hours later. Delivery was made in Rock Island—120 miles away at 9 A.M. sharp, the following morning.

This time-table graphically illus-

trates how fast and effectively Ryerson Steel Service swings into action when emergencies arise. With steel supply improving daily, our facilities for delivering all the steel you need exactly when you need it are better than ever. Just contact the nearest Ryerson plant for any steel requirement.



PRINCIPAL PRODUCTS

BARS—Carbon & alloy, hot rolled & cold finished

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Sheared & U. M., Inland 4-Way Floor Plate

SHEETS—Hot & cold rolled, many types and coatings

TUBING—Seamless & welded mechanical & boiler tubes

STAINLESS—Allegany plates, sheets, shapes, bars, tubing, pipe fittings, etc.

BABBITT—Ryerson Glyco

MACHINERY & TOOLS—For metal fabrication



RYERSON STEEL

Joseph T. Ryerson & Son, Inc. Plants at: New York • Boston • Philadelphia • Detroit • Cincinnati • Cleveland • Pittsburgh • Buffalo • Chicago • Milwaukee • St. Louis • Los Angeles • San Francisco

NEWS *of the* AUTOMOTIVE INDUSTRIES

Vol. 101, No. 8

October 15, 1949

May Smash 1929 Record Car Output This Month

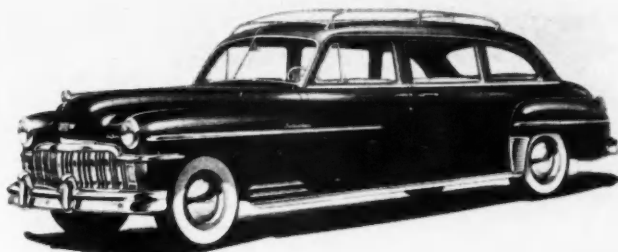
Despite the serious implications of the steel strike, there is an excellent possibility that the automobile industry late this month will pass the all-time yearly production record of 5,358,420 cars and trucks built in U. S. plants. Production after the first full week in October stood at roughly 5,006,000 vehicles, leaving about 352,000 vehicles for the last three weeks of this month to equal the record. Production during the first week in October was approximately 139,000 units, and all that would be needed for the remainder of the month would be about 118,000 units a week which would normally be a very easy accomplishment. It looks as though there may be enough steel in the hands of the manufacturers and probably in the stocks of suppliers to carry the industry well over the 1929 mark this month, provided an unexpected hitch doesn't develop in the supplies of key vendors. Actually, no one knows exactly just where and when the shortage will strike a vital cog in the production machine of each company, but the chances are good that enough of the industry will be able to keep going all this month to set a new yearly record.

Crosley Cuts Prices on All Models

Crosley Motors, Inc., has cut prices by \$51 to \$105 on its entire line of passenger and commercial cars. A reduction of \$105 brings the retail factory delivered price of the station wagon at Marion, Ind., to \$894. Sedan deluxe and club convertible models have been reduced \$101 to \$866. The new Hotshot sports roadster has been reduced \$51 to deliver for \$861 at the factory. Cuts have also been made in other models including panel delivery and pickup trucks.

Vauxhall Plans \$28 Million Plant Modernization

Vauxhall Motors Ltd., English subsidiary of GM, has announced a \$28 million three-year modernization and development program, designed to reduce costs and expand exports. Vauxhall has placed privately, through Morgan Grenfel, \$8.4 million four per cent 10-year notes at



SIX AND SIX SUBURBAN

Now in production, the latest version of the DeSoto Suburban has an overall length of over 18 ft. By folding down the rear seat, the Suburban will seat six passengers and provide six ft of luggage space from the back of the second seat to the deck lid opening. In another variation, the second seat slides forward, providing 7 2/3 ft of cargo space and seating room for three passengers.

par; the remaining \$19.6 will be provided from the company's own resources.

Playboy Gets Temporary Adjournment

A last-minute move by a group of franchise holders stayed the liquidator's hammer from falling on the Playboy Motor Car Corporation on Oct. 4. Federal Judge John Knight adjourned reorganization hearings at the request of a group of franchise holders who have organized under the name of Northern New England Committee, and are endeavoring to obtain a plant in New Hampshire where the automobiles could be manufactured. Reconstruction Finance Corporation funds are being sought. Attorney Edward H. Kavinsky, representing Trustee Allen H. Gardner, said that he opposed an adjournment unless some arrangements are made to pay the cost of maintaining the local plant, plus the expense of winterizing 27 automobiles.

Christopher To Retire As Packard President

George T. Christopher, president and general manager of Packard, has resigned, effective Dec. 31. The Packard

board of directors immediately elected Hugh J. Ferry, vice president, secretary and treasurer, to a newly created post of executive vice president in which he will work closely with Mr. Christopher. He will retain his duties as treasurer, but his secretarial activities will be assumed by E. C. Hoelzle, vice president and controller. The Packard board stated that it has no successor for Mr. Christopher in mind.

RFC Grants \$34.4 Million to Kaiser-Frazer

Consensus in Detroit is that the \$34.4 million loan granted by RFC to Kaiser-Frazer Corp. will be used at least in part for tooling for a smaller model automobile to be sold in competition with Ford, Chevrolet, and Plymouth. All the money, however, would not be required for tooling the new model on which considerable development work has already been done. It is understood that retooling for new models in the present line will also be involved, and in addition adequate working capital would be provided. The company also has outstanding a \$20 million line of credit with the Bank of America and the Mellon National Bank, but it is not known how much is owing against that obligation, or whether any part of the RFC loan

NEWS of the AUTOMOTIVE INDUSTRIES



KING SIZE!

The giant Firestone tires shown here, dwarfing men and cars, will be used to carry oil derricks to new drilling locations from finished wells in Arabia. Each of the 36.00-40 tires, reportedly, the largest size ever built commercially, is 9½ ft in diameter, weighs 3646 lb. and can carry a load of 55,200 lb.

would be used to retire it. K-F last year was the leading independent car producer, but this year has fallen off badly. It is estimated that up to Oct. 1 of this year production was approximately 54,000 units, compared with nearly 140,000 cars in the same period a year ago. The company was out of production the last week in September for "inventory adjustment," the fourth time K-F has been closed down this year for reasons other than labor trouble.

New Car Registrations Hit Postwar Peak in August

New car sales during August established a new postwar record, according to registrations compiled by R. L. Polk & Co. Total passenger car registrations for the month were 478,556, exceeding the previous postwar high made in July by approximately 30,000. The August record helped push new car sales past the three million mark, for the year, according to Polk. Truck registrations also boomed for the month of August, hitting 853,859, which was the highest month since August, 1948. Total registrations of new trucks this year is about 100,000 less than for the same period of last year.

Ford of Australia Shifts Top Executive

Hubert C. French, who has been managing director of the Ford Motor Co. of Australia, Ltd., since its inception in 1924, will retire from that position June 1, 1950, to assume the office of chairman of the board. His successor will be Charles A. Smith who has been managing director of the Ford Motor

Co. of South Africa, Ltd., since March, 1948. John S. Richards will succeed Mr. Smith in South Africa.

GM Elects Four New Vice Presidents

Hugh Dean, formerly general manufacturing manager for Chevrolet, has been made a vice president of GM in charge of the manufacturing staff which includes procurement and schedules, facilities and processes, and real estate. GM directors also elected three other new vice presidents. Carl H. Kindl as vice president will be group executive in charge of Canadian and Overseas Operations. He was formerly assistant to O. E. Hunt, executive vice president, who retired Oct. 1. Wilbur H. Norton was made vice president in charge of a new activity which includes development of policies and procedure for parts merchandising and assumes supervision of the United Motors Service Div. Elis S. Hoglund was also made a vice president, but will continue to serve as assistant general manager of the GM Overseas Operation Div. in charge of manufacturing plants abroad. Mr. Kindl, Cyrus R. Osborn, GM vice president and general manager of Electro-Motive Div., and Edward B. Newill, GM vice president and general manager of the Allison Div., were elected to the Administration Committee.

Budd to Build \$1.5 Million Foundry

Costing about \$1.5 million, a modern foundry will be erected in Philadelphia by the Budd Co., furnishing gray iron castings for other divisions of the com-

pany, so that Budd can better serve its automotive customers, particularly those who have Eastern assembly plants. The new structure will be a 120 by 360 ft, one-story brick building. It is estimated that between 400 and 500 workers will be employed after the new plant has gone into production. Ground will be broken next month and the first unit is expected to be in operation next spring.

Ford Buys Kelsey-Hayes Plant at Monroe, Mich.

The Ford Motor Co. has purchased the Kelsey-Hayes Wheel Co. plant in Monroe, Mich., including 570 acres of land fronting on Lake Erie. Included in the purchase are docks on the Monroe ship canal suitable for lake shipping operations. Plant facilities comprise about 650,000 sq ft of floor space including the main manufacturing and office buildings and four smaller structures. Ford has not announced the purchase price nor the nature of the operation to be carried on at the Monroe plant. However, it is understood that plans to use the facilities for a type of metal working process not now used by Ford to any great extent are under consideration.

SEC Approves Registration of Keller Motor Stock

After a delay of almost five months, the Securities & Exchange Commission has finally cleared a stock offering by Keller Motors Corp., Huntsville, Ala. George D. Keller, chairman and president, died suddenly in New York City on Oct. 5. Officials of the company stated that they intend to proceed with plans for production and financing. Headed by George M. Fisher, vice president in charge of production, a special interim committee was formed to take over Mr. Keller's duties. The issue consists of a proposed offering of five million shares of common stock, bearing a three cent par value, at \$1 a share. It is reported that when finally cleared, the registration statement contained an extra four pages of data on the company's background and production plans which was not included in the original statement. Keller Motors proposes to produce a station wagon in the low price field and it is understood to have produced 18 models. The registration statement said the company up to June 30 of this year had established more than 1500 dealer outlets. It said further that the company "must attempt to acquire almost simultaneously a salable product and a nation-wide dealer sales organization."

NEWS of the AUTOMOTIVE INDUSTRIES

UAW-CIO Reviews Pension Drive at Chrysler

The next major move by the UAW-CIO in the automobile industry is to be made against Chrysler. The union is seeking a pension plan similar to that granted by Ford which provides for pensions of \$100 monthly beginning at age 65. Chrysler is contending that under terms of its contract, pensions are not open for discussion this year and that only wages are negotiable. The general feeling in the industry, however, is that the pension pattern has been established as a fourth round increase, and that it will spread throughout the industry. The monthly benefit includes Federal social security old age benefits due the employee.

Cost to Ford is estimated at about \$20 million a year at the present rate of social security benefits, or about \$20 for each vehicle produced at the 1948 rate of production. Ford apparently obtained some concessions in return for the pension. It now has a 30 month contract, the longest in the history of the industry, which is open for negotiation on wages only once and not until after Jan. 1, 1951.

GM Breaks Ground for New Canadian Diesel Plant

Ground has been broken for the multi-million dollar plant of General Motors Diesel, Ltd., London, Ont., Canada, following formal ceremonies attended by C. R. Osborn, vice president of GM, and E. V. Rippingille, Jr., president and general manager of General Motors Diesel, Ltd.

Elect Cunningham President of ASME for 1950

The election of James Dalton Cunningham, president, Republic Flow Meters Co., Chicago, as the national president of the American Society of Mechanical Engineers for 1950, has been announced. Four regional vice presidents and two directors-at-large were also named.

New Car Window and Seat Regulators Shown

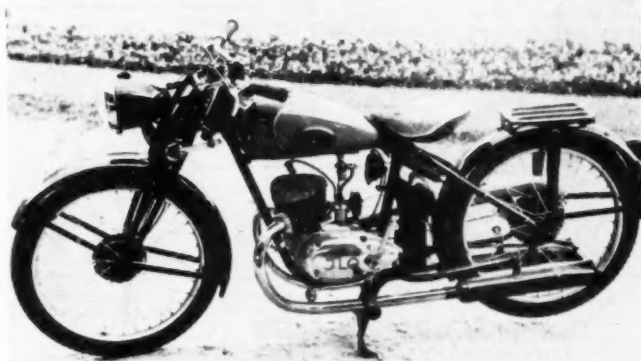
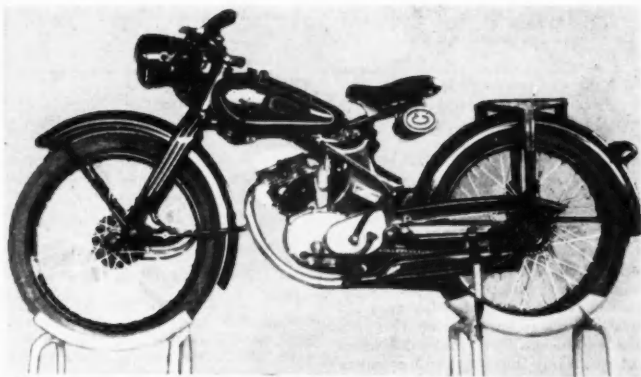
A unique lever and cam-groove window regulator permitting full opening and closing by simple movement of a lever and an unusual dash controlled seat adjustment regulator is being shown in the U. S. to several large motor car manufacturers by L. F. Moroney, Australian parts maker, who is appearing in this country under the auspices of the Australian Govt. The seat adjustment features two side rails with

positive locking controlled from a spring-loaded toggle mechanism. Dash control simplifies seat movement and permits good adjustment quickly and easily. It is claimed that the seat adjusting device is used on Anglia cars and is being sold as a replacement item on many makes of cars, including U. S. models used in Australia.

Court Orders Tucker Plant Returned to Government

Efforts to reorganize the Tucker Corp. received a severe jolt Oct. 4 when a Federal Court in Chicago ordered return of the plant to the War Assets Administration. The order also stipulated that trustees for the company were to have a 60-day option to re-negotiate a lease, purchase the property, or sell the

Tucker lease and option on the plant and machinery. Another development was a reorganization plan submitted to the trustees by an attorney for the stockholders. It proposes the establishment of a new company to be called the New Tucker Corp. to be financed by a new \$20 million issue of common stock to be offered to holders of present Tucker outstanding stock and to the public. Also involved in the reported financing would be a \$20 million loan from RFC and sale of the Tucker subsidiary, Aircooled Motors, Inc. at Syracuse, N. Y. Simultaneously with the order returning the plant to WAA, trial of Preston T. Tucker, president of the company, and seven associates charged with mail fraud and violations of the Security and Exchange act was getting under way in another Federal Court.



PAIR AT THE FIRST

Among the displays at the first large postwar automobile show held recently at Berlin's Funkturm, was the new frameless motorcycle produced by the Fox-Works in Germany (top), which was shown together with the new small Tornax motorcycle which has a piston displacement of about 7.6 cu. in. (bottom).

EUROPEAN

NEWS of the AUTOMOTIVE INDUSTRIES

NEW PASSENGER CAR REGISTRATIONS*

Arranged by Makes in Descending Order According to the Eight Months' Totals.

MAKE	EIGHT MONTHS							
	Units			Per Cent of Total				
	August 1949	July 1949	August 1948	1949	1948	1949	1948	
Chevrolet	114,034	106,449	61,509	654,576	470,443	21.19	20.64	
Ford	77,660	70,867	41,589	496,464	237,091	16.07	11.28	
Plymouth	80,911	45,071	38,149	329,609	225,353	10.67	9.89	
Buick	33,660	31,432	21,804	246,246	166,996	7.97	7.33	
Pontiac	34,264	30,488	19,310	206,557	152,961	6.66	6.71	
Oldsmobile	28,734	24,831	16,133	173,622	121,371	5.63	5.33	
Dodge	29,733	26,833	20,807	163,079	144,137	5.29	6.33	
Studebaker	13,820	19,617	11,511	123,696	97,677	4.00	4.29	
Mercury	18,189	16,060	14,664	111,909	78,557	3.62	3.46	
Hudson	11,480	12,293	7,795	100,959	77,300	3.27	3.39	
Nash	13,763	13,551	10,667	92,124	82,221	2.98	3.61	
Chrysler	12,956	11,175	10,532	82,660	70,795	2.68	3.11	
Packard	9,857	9,267	7,262	67,574	52,801	2.19	2.32	
De Soto	9,969	6,703	6,192	65,483	54,505	2.12	2.39	
Cadillac	6,900	6,621	6,068	54,066	38,644	1.75	1.70	
Kaiser	6,216	6,595	11,645	44,063	78,229	1.43	3.43	
Lincoln	3,066	2,589	2,810	25,799	18,817	.83	.83	
Willys	2,625	2,911	645	19,371	15,120	.63	.66	
Frazer	1,008	1,191	3,312	13,535	45,011	.44	1.96	
Crosley	770	757	2,747	7,695	18,908	.25	.83	
British Ford	368	414	597	4,463	1,234	.14	.05	
Austin	230	262	1,002	2,045	6,515	.07	.29	
All Others	327	380	798	3,654	3,536	.13	.15	
Total	478,556	446,477	317,768	3,088,649	2,278,522	100.00	100.00	

* Based on data from R. L. Polk & Co.

Packard and Briggs First to Feel Steel Strike

With the steel strike a grim reality, automobile manufacturers a week ago were getting apprehensive over continued production. Packard was the first to trim operations, suspending assembly on Oct. 6 and 7 and reopening the following week at a reduced rate. The Packard reduction also affected Briggs which closed Oct. 6 and 7 and resumed operations the following week also on a curtailed basis. Other manufacturers were estimating that they could continue from two to four weeks. A fortunate aspect of the situation is that production has been at a very high rate in recent weeks despite some grumbling from dealers whose inventories were rising. Even if the industry is forced down, the stock of cars on hand will provide some cushion although it will not last too long.

Elect Ladds Member of Lock Thread's Board

H. P. Ladds, president, the National Screw & Mfg. Company, Cleveland, O. has been elected to the Board of Directors of the Lock Thread Corp., Detroit, Mich.

Flader to Operate Government Lab

Frederic Flader Inc., research and experimental engineering concern of North Tonawanda, N. Y., has completed arrangements with the U. S. Air Force for the operation of the Government-owned laboratory facilities at Toledo, O.

The laboratory, formerly operated by the Packard Motor Car Co. under an Air Force contract, will be used by Flader to test machines, jet engines, radio instruments and other equipment designed by company engineers.

Monroe Auto Equipment Net Hits New High

Earnings for the fiscal year ended June 30 are reported by Monroe Auto Equipment Co. as \$914,558, the highest in the company's history. Profit for the

previous year was \$539,891. Sales also hit a new peak totaling more than \$18 million, an increase of nearly \$5 million over the previous year. A heavy increase in replacement sales of automobile shock absorbers was a major factor in the company's higher earnings, according to B. D. McIntyre, president.

Willys Denies Report on Small Car Soon

Willys has denied a report that it will announce its long awaited passenger car this winter, but it is definitely known that the company is again talking with suppliers about components for such a vehicle, and there is a possibility that the car might be offered next spring or summer.

GM Develops Process for Smoother Plating

During a recent press tour of General Motors Research laboratories, engineers revealed one of the GMR developments that has been incorporated in recent plating operations throughout the corporation. It involves drawing solution off from the copper electrode side of the vat and passing it through a filter before it is reintroduced as a clean solution into the vat. A curtain of a filtering material is placed between the copper electrode and the part being plated to prevent material that sloughs off the copper electrode from coming in contact with the plated part. The result is a much smoother plated surface.

NEW TRUCK REGISTRATIONS*

Arranged by Makes in Descending Order According to the Eight Months' Totals.

MAKE	EIGHT MONTHS							
	Units			Per Cent of Total				
	August 1949	July 1949	August 1948	1949	1948	1949	1948	
Chevrolet	29,698	28,258	23,691	230,464	205,717	36.71	28.56	
Ford	19,933	14,958	20,826	117,065	162,613	18.64	22.57	
Dodge	10,180	9,169	10,164	77,380	76,926	12.32	10.68	
International	6,331	7,385	10,593	61,001	92,689	9.72	12.86	
G. M. C.	7,551	7,127	6,852	54,206	47,555	8.63	6.80	
Studebaker	4,950	4,885	4,944	38,067	33,464	6.06	4.64	
Willys-Track	1,253	1,306	2,386	13,905	19,331	2.21	2.54	
Willys-Jeep	948	1,096	5,238	10,739	35,426	1.71	4.82	
White	615	626	876	5,437	8,175	.87	1.13	
Mac	603	524	796	4,171	7,170	.66	1.00	
Diamond-T	368	347	1,016	3,665	7,649	.56	1.06	
Reo	276	228	949	2,673	8,246	.43	1.14	
Divco	237	279	446	2,419	4,109	.39	.57	
Autocar	105	106	204	1,157	1,898	.18	.26	
Brookway	110	113	196	986	2,077	.16	.29	
Federal	57	61	281	862	3,221	.14	.45	
Crosley	56	44	209	684	1,830	.11	.25	
Pontiac	21	37	43	27404	.04	
Kearney	24	34	26	287	286	.04	.04	
F. W. D.	19	20	44	233	650	.04	.09	
Sterling	14	32	39	159	323	.03	.04	
All Others	189	211	208	2,065	2,129	.33	.31	
Total	85,539	76,686	91,923	627,831	729,476	100.00	100.00	

* Based on data from R. L. Polk & Co.

NEWS of the AUTOMOTIVE INDUSTRIES

Revised Estimate Boosts Nash Changeover Cost

Further information from Nash dealing with changeover costs on the 1950 model series indicates that the \$1.7 million previously quoted was not the complete cost. Nash now says that total expense involved in the changeover of both models including engine, chassis and body operations was approximately \$3 million.

O. E. Hunt Retires from GM Continues as Director

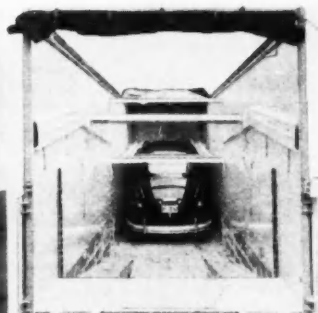
O. E. Hunt, executive vice president of GM, retired Oct. 1 after 40 years in the automobile industry. However, he

of isolated work areas for development work, additional projection and visual construction space, doubled library and student study facilities, an experimental lecture and demonstration amphitheater and a personnel development research laboratory.

GMC Appoints Roger Kyes Asst. General Manager

Roger M. Kyes has been made assistant general manager of GMC Truck & Coach Div. He had previously been in charge of the procurement and scheduling staff of the GM central office for the past year. Before joining GM in late 1947, he had been president and general manager of Harry Fergu-

tions on exclusive dealerships. FTC has accused Harley-Davidson of anti-trust violations in connection with its insistence that dealers handle H-D products exclusively. The principal point of issue in the case is coercion of dealers by the factory as charged by the government. Automobile companies are currently prevented by law from forcing dealers to handle factory parts, accessories, and supplies and if only that phase of the business is involved in the H-D suit there is little of concern to the automobile industry. However, if the FTC should maintain successfully that an exclusive selling franchise for vehicles is illegal and be upheld in the courts, it could have grave and widespread effects on the motor vehicle selling trade which is tradi-



ANTIDOTE FOR DEADHEADS

In a joint agreement between the Evans Products Co., and the Fruehauf Trailer Co., exclusive manufacturing rights on the Tri-Level truck-trailer, shown above, have been granted to Fruehauf.

The trailer, which can be converted quickly from an automobile driveway into a standard freight van, will help reduce or eliminate non-revenue producing, or deadhead, return trips.

continues as a member of the GM board of directors. Mr. Hunt started the GM product study organization which has made notable contributions in the fields of independent suspension and automatic transmissions.

General Motors Institute to Expand Facilities

Buildings and facilities at the General Motors Institute at Flint, Mich., will be expanded by enlargement of present structures and increased laboratories area amounting to about 38,500 additional sq ft, according to Harry B. Coen, vice president in charge of employee relations. The expansion will include expansion in the automotive engineering, tool and die, metallurgy and engineering materials, gas and arc welding, and heat and power laboratories. Also included will be nine class rooms, a larger number

son, Inc. He is succeeded in his previous post by Daniel F. Hulgrave formerly director of the purchasing and salvage section of the GM procurement and scheduling staff.

Ex-Cell-O Corp. Net Shows Sharp Increase

The Ex-Cell-O Corp. has reported a substantial increase in earnings for the first nine months of this year. In that period, net earnings were \$2,790,799, compared to \$1,880,075 for the same period of 1948.

FTC Suit May Affect Exclusive Franchises

The automobile industry is watching a current Federal Trade Commission action against Harley-Davidson Motorcycle Co. for possible future implica-

tions based on an exclusive franchise for one make or in a few cases two or more non-competing products.

New Plant for Int'l Harvester in Brazil

A new motor truck assembly plant and central machine and repair parts depot has been added to the facilities of International Harvester Maquinas, S.A., the Brazilian subsidiary of the International Harvester Co., with the official opening of a 72,000 sq ft, one-story building located at Santo Andre, a suburb of Sao Paulo, Brazil. At the time that it was decided to proceed with this project, \$1 million was appropriated from retained earnings of International Harvester Maquinas, S.A., for the plant expansion and complete motor truck assembly. The next step may be manufacture of International trucks in Brazil. When operations are at full capacity,

NEWS of the AUTOMOTIVE INDUSTRIES

Santo Andre will employ approximately 200 men for the assembly line and parts depot. Up to 25 completely knocked down trucks can be assembled and delivered by Santo Andre each day, when operating at capacity.

Ford of Canada Absorbs Devaluation Cost

Ford Motor Co. of Canada, Ltd., has announced that it will hold the line on passenger car and truck prices despite higher production costs owing to devaluation of the Canadian dollar. Tractors, however, which are imported from the United States will go up about \$90.

Ford Establishes Office to Handle Tax Affairs

The Ford Motor Co. has established an office of tax affairs to direct all tax matters of the company. It will be headed by Alan L. Gornick, who previously was associate counsel in charge of tax matters. The office was formed to centralize all company tax affairs, including income, property, franchise, social security, excise, and sales tax matters. It will be responsible directly to the president and executive vice president. The company has also announced that Donald Kehl has been promoted from associate counsel to assistant general counsel.

chase of 21½ acres of land for a factory site in a new industrial area in Oshawa's southeastern section. The option is good until Dec. 31. A GM spokesman said that the company plans to build a plant which will provide additional facilities for handling of parts and accessories. At present, these items are dealt with in quarters in the main plant.

Muskegon Motor Specialties to Move to Jackson

The Muskegon Motor Specialties Co. is planning to move operations to Jackson, Mich., from Muskegon, Mich., according to Charles Getler, president, Houdaille-Hershey Corp., Muskegon's parent company.

Chevrolet Promotes Scott to Manufacturing Chief

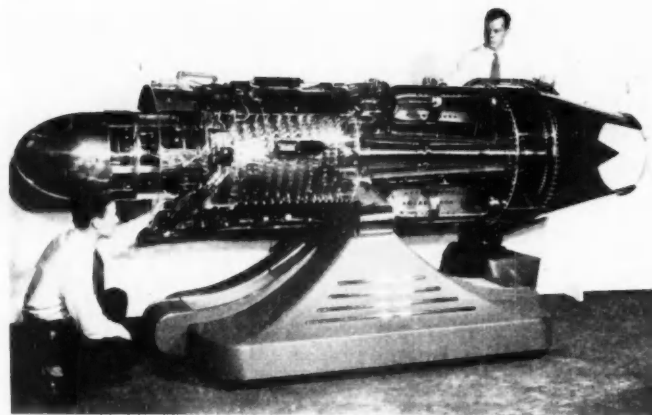
W. J. Scott, who has been manager of manufacturing plants for Chevrolet, has been promoted to general manufacturing manager. He succeeds Hugh Dean, who was made a GM vice president. E. S. Wellock, who had been manager of assembly plants, was named to succeed Mr. Scott as manager of manufacturing plants. He in turn is succeeded as manager of assembly plants by R. G. Ford, who previously had been general purchasing agent.

Pontiac Not Expected to Add Larger Series

While no definite official confirmation is available, it is understood on good authority that the 1950 Pontiac line will not include a larger series. During the 1949 model run Pontiac has concentrated on one basic chassis, whereas in previous years it offered two lines with different wheelbases and body sizes. It is reported that the division is firmly committed to a price position just above the lowest price field and will concentrate its efforts in that area.

Hopes Dim for Settlement of Ford-Ferguson Suit

Latest reports indicate that possibility of an out-of-court settlement between the Ford Motor Co. and Harry Ferguson involving the latter's \$251 million law suit against Ford are remote. Early in October, Henry Ford II arrived in Europe for a tour of the company's overseas operations and stated that interviews had been arranged with Mr. Ferguson which might



ON THE INSIDE

This cutaway General Electric J-47 aircraft turbojet was displayed recently for the first time. Reportedly the most powerful jet engine in production in the U. S., it develops over 5000 lb of thrust. Air is swallowed into the engine at an airflow rate of 90 psi. The J-47 measures 36¾ in. in diameter, is 12 ft long, and weighs about 2500 lb.

Cars, trucks, and tractors imported from the Ford English operation into Canada will be reduced in price. The company estimates that it will have to absorb about a 10 per cent increase in the cost of materials and parts bought in the U. S.

Firestone Develops New Cold Weather Rubber

The Firestone Tire & Rubber Co. has announced a new synthetic rubber that retains its resilience at temperatures as low as -75 F. It is considered particularly valuable for Arctic use where other types of rubber become stiff and subject to chipping.

Indian Ban Hits Import of American Automobiles

Builders of American cars have received a new setback in the export market with the announcement that India will ban imports of American cars. The order also applies to companies with plants in India for assembly of U. S. and Canadian cars. Trucks, however, may still be imported.

GM of Canada Takes Option on 21 Acres

The City Council of Oshawa, Ont., Canada, has granted General Motors of Canada, Ltd., an option for the pur-

NEWS of the AUTOMOTIVE INDUSTRIES

result in settlement of the litigation between the two companies over cancellation of the Ferguson contract to market Ford tractors in this country. However, it is reported that Ferguson rejected the attempt as completely unacceptable. Ford spokesmen in Detroit would give no details as to what the possible settlement offer might have been. In addition to the \$251 million suit by Ferguson, other actions by Ferguson distributors against Ford total about \$20 million.

Fisher Appoints Hanson Factory Manager

Elmer J. Hanson, previously general factory manager of fabricating plants for GM's Fisher Body Div., has been appointed general manufacturing manager. He fills a post left vacant by A. J. Cronin, who was recently made a vice president of GM in charge of its automobile body building division, when he became Fisher general manager.

Nash Planning Assembly of Cars in Canada

After a delay of more than four years, Nash is preparing to inaugurate assembly operations in Canada early next year. Start of operations there has been delayed because of currency restrictions which made it impossible for Nash Motors of Canada, Ltd. to import American products. The company now says, however, that if no further economic restrictions are imposed, the plant at Toronto will start limited production next February. In a report to stockholders, George W. Mason, president, said that the fiscal year ended Sept. 30 was the best in Nash history with sales exceeding the 1948 level by about 17 per cent, and with earnings at a very satisfactory level. While the report did not give any earnings for the year, Nash earned more than \$20 million in the first nine months of its last fiscal year.

New Compound Bonds Butyl to Metal

Since the development of butyl rubber, a major problem has been a means of adhering or splicing it to other materials. Dayton Chemical Products Laboratories of West Alexander, O., now claims to have solved the problem of bonding butyl rubber to metal during molding operations with a new preparation which it has developed. Automotive applications include vibration-reducing mountings, bumpers, and other molded

articles where butyl rubber must be adhered permanently to a metal base. The company has also formulated compounds for bonding butyl to other types of rubber.

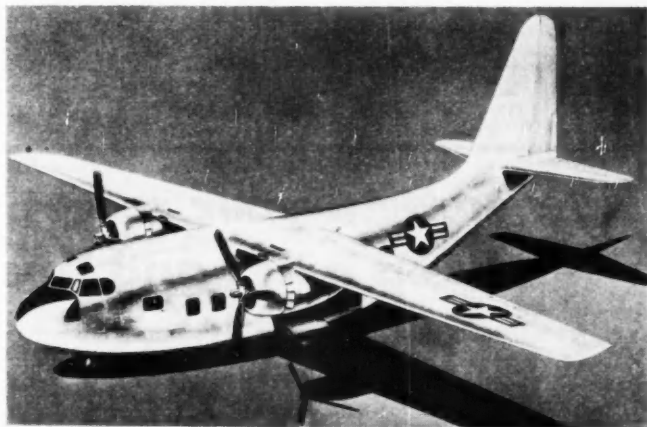
Kaiser Fleetwings Changes Name

Kaiser Fleetwings, Inc., has changed its name to Kaiser Metal Products, Inc. The change marks a conversion program which has taken the firm out of the manufacture of aircraft components and into the production of consumer goods and automobile parts, according to Henry J. Kaiser, chairman.

rubber will be allowed in passenger car and small-sized truck tires. The Commerce Dept. has revised its regulations to reduce the average use of synthetic rubber in passenger car and some truck tires to 35 per cent from the previous minimum of 45 per cent. Mandatory use of butyl rubber in medium-sized tubes is entirely removed.

GM Developing Aluminum Coated Mufflers

At a recent press conference at General Motors Research it was revealed that considerable experimental work has been done in the development of aluminum coated steel parts for muff-



BASH AND CARRY

Built by the Chase Aircraft Co., Inc., West Trenton, N. J., the USAF's XC-123, twin-engine assault transport aircraft, is powered by two Pratt and Whitney R-2800 engines, each developing 2400 hp. Designed to transport personnel and supplies into small fields, the XC-123 has a wing span of 110 ft., is 77 ft. long, and 32 ft., 8 in. high.

Hillman Retires as Head of Service for Chrysler

William A. Hillman has retired as director of service of the Chrysler Div. of Chrysler Corp. He had served the company and its predecessors for more than 36 years. He has been succeeded by Frank E. Van Halteren who was promoted from assistant director of service. He in turn is succeeded by John R. Maxey, formerly claims manager.

More Natural Rubber Allowed in Tires

As a result of trade talks between the United States, Britain and Canada recently, a higher percentage of natural

rubber. As a matter of fact it was said that about 10 per cent of Chevrolet replacement mufflers are aluminum coated. While no definite figures were given, it is understood that mufflers of this type have been used to some extent in trucks and buses as well. Laboratory and service testing indicates that aluminum coated mufflers have a life expectancy about three times that of conventional mufflers.

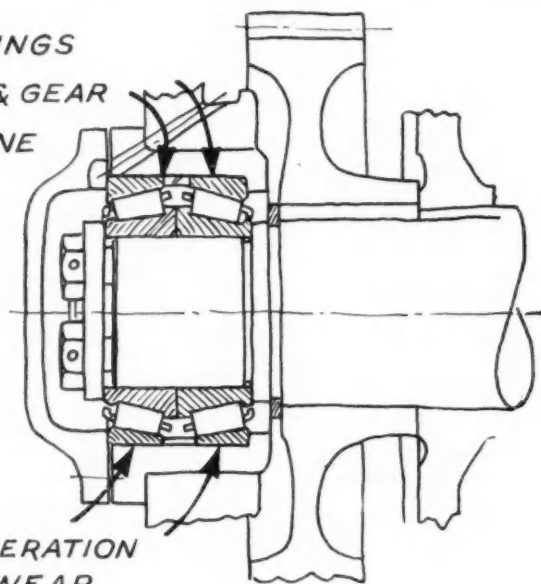
In the fabrication of these mufflers the outer shell is made of aluminized steel which is commercially available. However, the inner parts which require formation and perforation are made by a new aluminum dip process developed by GMR.

(Turn to page 98, please)

TIMKEN BEARINGS

HOLD SHAFT & GEAR
RIGIDLY IN LINE

SMOOTHER OPERATION
— LESS WEAR

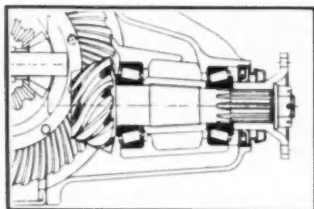


How to help your secret transmission keep quiet and live longer

WANT that new transmission on your drawing boards to be quiet as a kitten and have "nine lives" too?

You'll get a good start toward these goals by including Timken tapered roller bearings in your design. Timken bearings keep shafts rigidly in line. Deflection and end-movement are eliminated. Operation is smoother, wear and tear on moving parts reduced. Where gears are involved, Timken bearings provide closer meshing.

Design is simplified by Timken bearings, also. Because they take both radial and thrust loads, no separate thrust bearings or washers are needed. Since line contact between rolls and races gives Timken bearings greater load capacity, you can use smaller bearings, save



All but two cars use Timken bearings on the pinion. Here's a typical application. space. And machining tolerances of adjacent parts can be greater because Timken bearings permit precise, permanent adjustment at installation.

More evidence that Timken bearings are best for transmissions can be found in the industry's toughest bearing job—pinions. All but two makes of cars now use Timken bearings on the pinion.

Get help with your particular bearing problems from our engineering staff. In Detroit, phone TRinity 5-1380. The Timken Roller Bearing Company, Canton 6, O. Cable address: "TIMROSCO".

NOTE TO P.A.'S. Because every step of the manufacture of Timken bearings is controlled within our company...because our vast manufacturing facilities are widely dispersed...you will find The Timken Roller Bearing Company a supply source of outstanding reliability.

TIMKEN
TRADE MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



50th birthday of the company whose products you know by the trade-mark: TIMKEN

NOT JUST A BALL  NOT JUST A ROLLER  THE TIMKEN TAPERED ROLLER  BEARING TAKES RADIAL  AND THRUST  LOADS OR ANY COMBINATION 

United States

By Leonard Westrate

The general reaction of the U. S. automobile industry to the devaluation of the British pound and currencies by other countries is mixed. There is general agreement, however, that the action will result in drastically curtailing exports of American cars to the affected countries, accelerating a trend that had already reached one of the lowest points in history. As for competition from imported cars bearing lower price tags because of the currency devaluation by countries of manufacture, there is little concern since the general opinion is that even with a reduction of 20 to 30 per cent in price, the lowest-priced new cars and the plentiful supply of good used cars will be able to offer more value.

The general opinion is that competition from devalued currency countries will not be felt so much in this country as in other markets where they sell in competition with American cars, principally South America and South Africa. In those countries, lower-priced foreign cars will probably have more appeal to buyers, and be more able to compete with the American product because of higher costs to American builders to put their cars on the market there.

One reaction to the whole situation is that with exports making a very poor showing anyway, the net effect of further reduction will not be as great percentage-wise as it might have been if the foreign market had been a larger percentage of total business. During August, for example, only 22,625 cars and trucks were shipped abroad or 3.4 per cent of total factory sales, one of the lowest percentages on record. The actual number of cars exported has been dropping steadily all year, and for the first eight months of this year stood at 208,215 vehicles, a decrease of 30 per cent under the same period last year. Broken down, exports in August this year show 12,740 passenger cars or 2.3 per cent of total factory sales and 9861 trucks or 9.9 per cent of factory sales.

While importers are claiming that interest in foreign automobiles has revived with price cuts already announced or impending because of the currency devaluation, there is little evidence yet that the number of imported cars will be greatly increased. Austin has cut the prices of its Devon and Dorset sedans and Atlantic convertible about 15 per cent, while the price of its Countryman station wagon has been slashed approximately 28 per cent. The company's A40 one-half ton pick-up truck was cut 13.4 per cent, and its one-half ton panel delivery, 11.4 per cent.

Some observers are pointing out that the smaller cars, which may now come into this country, will provide a test for claims by union leaders and others that a small, low-powered car selling for \$1200 to \$1300 would meet strong demand. The experience of Ford dealers with the English Ford which they imported for sale in this country during the car shortage does not augur too favorably for any active market. Actually, there are still about 2000 English Fords unsold in this country despite the fact that many dealers cut the price below their invoice cost.

While it is too early to tell yet just how much American export sales on cars will be cut by the currency devaluation, it is believed that the general practice will be to allot about the same amount of dollars for American vehicles as previously with the decrease in the number of cars that can be bought about equivalent to the per cent of devaluation.

England

By W. F. Bradley.

Special European
Correspondent for AUTOMOTIVE INDUSTRIES

British automobile interests are not yet decided just how far devaluation is going to help them in their export drive. Sir William Rootes, head of the Rootes Group, is convinced that this slash will make it easier to sell cars in dollar countries, but as factories at present are working at only 65 per cent of their capacity, the Government must not hesitate to import sheet steel, even if that involves spending dollars.

Lord Nuffield is also of the opinion that sales will increase with devalued sterling, but as dealers have stocks in hand, it is impossible to indicate the amount of the drop or when it will be applied. The head of the Morris organization insists on more abundant supplies of steel and less Government interference in placing steel orders. Produced specially for export in the Nuffield line is a new 152 cu in. Riley convertible coupe for which a speed of 100 mph is claimed.

Austin is optimistic regarding the export program and announces that, with a view to cutting costs, shipments are now being made directly from London

docks to Cleveland, O., via the Great Lakes. Only one shipment can be made this year before the St. Lawrence freezes over, but it will be continued next year, and should show some saving over the normal method of shipping to an Eastern port and trucking to the Middle West.

Other observers are depressed, feeling that devaluation will be followed by inflation and rising wages. Observers say that devaluation is almost invariably followed by a slow rise in currency prices which usually absorbs all or most of the amount of the devaluation. There are no indications that workers will heed the plea to peg wages to their present standards. Gasoline prices will probably rise, unless the Iranian output can be increased considerably.

With sterling standing at \$2.80, it will be necessary to increase exports to the United States by two-fifths merely to get a return equal to that before devaluation. There is a feeling that the new measure cannot do more than stop the slide which has been going on all this year. In February British exports to the United States were 697 passenger cars. This number dropped to 154 in June and July. Trucks, which numbered 139 in February, had dropped to 132 in March. From the end of that month to the end of July exports were only four commercial vehicles.

Should the export drive succeed, it is obvious that the home market will be still further starved. This would cause a hardening of used car prices.

Canada

Special to AUTOMOTIVE INDUSTRIES

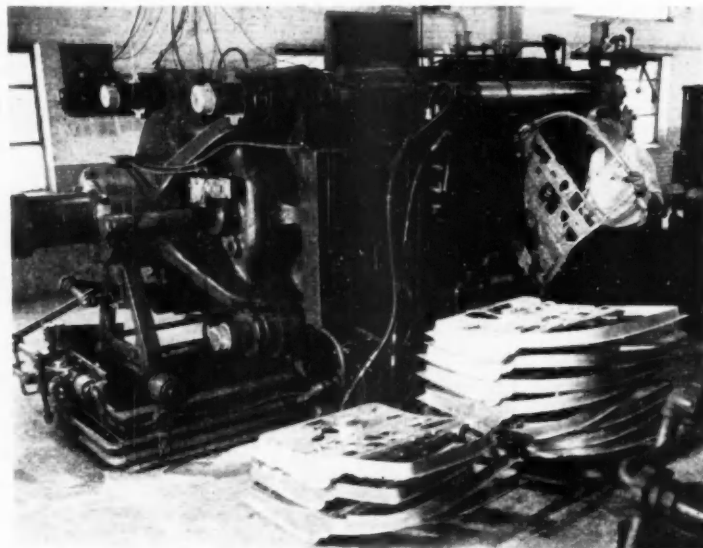
The prices of British cars in Toronto have already dropped \$220 to \$755, depending on models, as a result of the revaluation of the British pound and the Canadian dollar, a survey of importers has revealed. The prices of Canadian cars will probably be increased slightly; while the prices of imported U. S. automobiles will almost inevitably be raised approximately 10 per cent, dealers agree.

The biggest slash in British car prices was announced by G. N. Lapan, of British Cars and Vans, importers of Vanguard automobiles. Vanguard's deluxe Triumph convertible, a full-sized

(Turn to page 68, please)



Studebaker recently completed its new press shop which entailed an expenditure of about \$3-million dollars for presses and building alterations. The plant contains five 750-ton presses, two 650-ton presses, 12 of 500-ton capacity, and 29 units of 95-ton capacity. Some of the presses are tooled with four to six dies each and require as many men to operate each one. Shown here is one of the 750-ton presses, a double action press with a bed area of 90 by 148 in. used for forming the left front fender for 1950 Champion cars. Side gages on the die permit rapid and easy insertion of sheet metal. The horn on the upper section of the die eliminates the need for hand-forming.



Greater In

By
Joseph Geschelin

THE great automotive industries—spread throughout the Continental U.S.A. and reaching the far corners of the globe—have attained the stature of the largest single industrial unit in our economy. From modest beginnings some 50 years ago the industry has grown and expanded and beyond question represents one of the major supports of our economy—in employment, in taxes, and in the purchases of raw materials, machine tools, and equipment.

According to *Automobile Facts and Figures* (AMA) 1949, employment as of March 1947 in motor vehicle and equipment manufacture alone was 765,708 in the United States. But total employment, including all services connected with the sales, operation, and maintenance of motor vehicles represents a grand total of 2,486,436.

The automotive industries—motor cars, motor trucks, buses, tractors, off-the-highway vehicles, motorized road and farm machinery, gasoline and Diesel engines of all types, body plants, parts and accessories, etc.—represent the largest single market for ma-

This is the giant die-casting machine on which experimental inner door frames are being made for Kaiser-Fraser. The aluminum door casting being removed from the 13-ton die set weighs less than 13 lbs after trimming. The die casting machine shown here is about six ft. three in. in height and about 16 ft long.

Equipment Buying Ahead The Automotive Industries

For Years the Largest Buyers of Machine Tools, the Automotive Industries are Adding New Production Equipment at an Ever-Increasing Rate Because of Continual Improvements in Product Design. Automatic Transmissions, Newly - Designed Higher Compression Engines, Disk Brakes, and Other Mechanical Developments Will Require Still More Specialized Production Equipment.

chine tools, without exception. Prewar it was estimated that this group accounted for some 42 per cent of all machine tool volume. What it is today is a matter of conjecture. Certainly on the face of visual evidence not only has it maintained this percentage but doubtless has exceeded it.

During the war years—1940-1945—the machine tool and other production equipment industries staggered through an amazing epoch of expansion of productive facilities and dollar volume. It was crowded beyond all limits of human endurance in the process. Then war orders stopped with disheartening finality and volume dropped overnight.

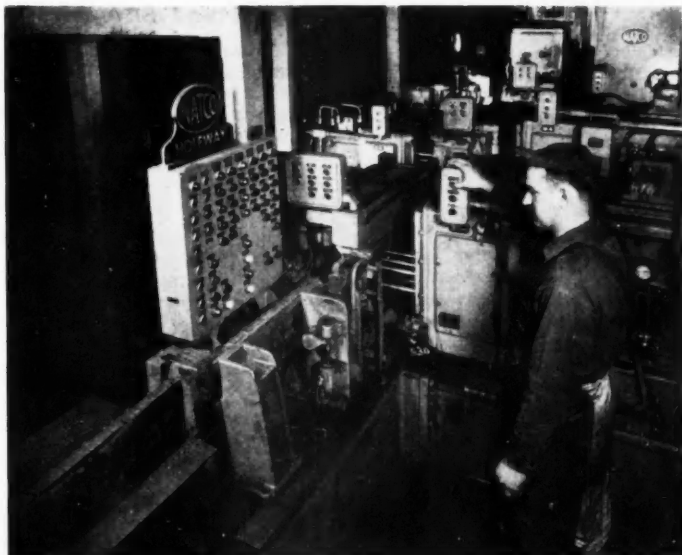
In the intervening years the makers of production equipment have succeeded in stabilizing their operations. They have accepted the economic fact that dollar volume must be related to prewar experience rather than the abnormal condi-

tions that existed during the war years. Normalcy in the field has had to be predicated upon peacetime operations and postwar buying tempo.

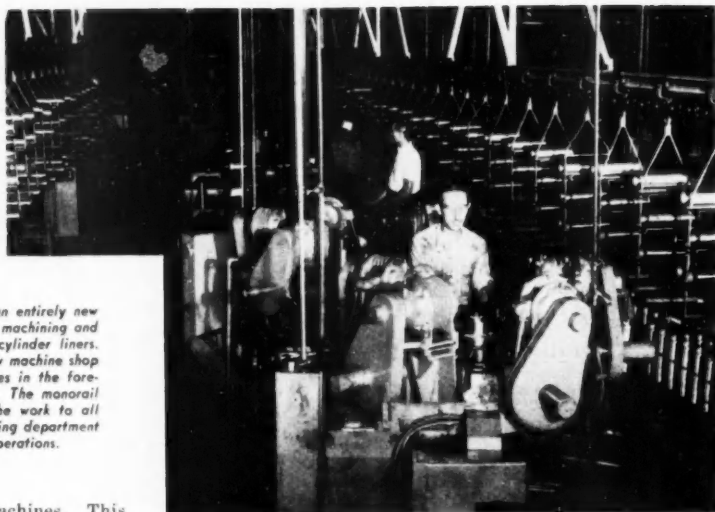
Yet even during the period of drastic readjustment one significant trend was evident—the automotive industries emerged not only as the largest single industry buyer of machine tools but has been accelerating its acquisition of machine tools and other production equipment at an increasing rate.

While this performance has been spectacular, it may not have been evident to all members of the machine tool industry because the equipment installed since the end of the war has been largely of special-purpose type. This industry pioneered the adoption of transfer machine lines and the process is continuing unabated. Where transfer machines have not been justified manufacturers have installed single-

Among the new items of equipment recently placed in operation at Pontiac is this transfer machine. It drills 46 holes and taps 16 holes, automatically, in cylinder heads as they are transported through the various stations. The machine is so arranged, in the interest of safety, that if a cylinder head gets out of alignment in any of the seven stations, it is automatically stopped and a warning is flashed on the panel at the left.



Detroit Diesel recently installed an entirely new and self-contained department for machining and Martempering heat treatment of cylinder liners. Here is a view of a bay in the new machine shop showing five-head drilling machines in the foreground for drilling the port belt. The monorail conveyor on both sides carries the work to all machine stations, to the heat treating department and back to finish-grinding operations.



purpose and special-purpose machines. This does not imply that standard machines have not been replaced. It is simply a fact that special equipment buying has diverted attention from purchases of other types.

It is only natural to find that a large percentage of buying has been concentrated with producers who deliberately chose to enter the special equipment field, those who chose to devote their inventive talents and cooperative engineering services to the special needs of the automotive industries. Many manufacturers of production equipment have profited thereby and there is room for competition.

The pages of *AUTOMOTIVE INDUSTRIES* since the end of the war are replete with descriptions of new plants and new departments built or rebuilt and tooled for new products and new vehicle models. Even this brief sampling—and a sampling it is—furnishes evidence of the enormous wave of modernization rising to meet the competitive conditions of today.

But that is only the beginning of a process which never stops in this field. For example, most mechanical elements of the automobile are in a state of flux. Some motor car engines are practically obsolete and others may be obsolete in the near future because of the undoubted trend to higher compression ratios coupled with greater output per cu in. of displacement—which means lower weight and smaller packages.

In the case of engines—a major item of tooling—Oldsmobile and Cadillac are the only examples of radical change in design. That leaves, so far as General Motors is concerned, Buick, Chevrolet, and Pontiac still to be accounted for. Packard had a

redesign postwar and with it an important machine tool program. Similarly Hudson expended a considerable sum of money in the facilities for its postwar big six engine.

Potentially this is one of the most fertile fields for exploitation by machinery builders. The late comers should be able to take advantage of all the accumulated experience of those who pioneered the present trend to transfer machinery.

It is true of transmissions to a still greater extent because of the immediacy of radical changes. It is

safe to say that within two years automatic transmissions of one type or another will be made available for practically every make of car on the road. Right now Packard is completing one of the most modernly tooled plants in the industry for building its Ultramatic. Chevrolet already is reported in production on its torque converter transmission in its plant in Cleveland. Buick has more than doubled, by now, its facilities for building Dynaflo. Since this was the first hydraulic torque converter transmission in production in the passenger

car field if design changes are contemplated in the near future that could well mean installation of additional equipment to a plant now worth over \$20 million.

(Turn to page 67, please)

Huge Spenders

Motor vehicle firms spend well over half their total dollar receipts for supplies. In all, the industry buys more than \$5 billions in materials yearly from outside firms, in all 48 states and some 55 foreign countries.

A typical medium-sized automobile firm, for example, buys from 7300 vendors, who supply some 70,000 different kinds of items—varying from pig iron and presses to yard locomotives and paper clips. Larger automobile firms may deal with as many as 25,000 separate suppliers.

from Automobile Facts

31st National Metal Congress and Exposition



DURING the 1949 National Metal Congress and Exposition, the 31st annual event, at Cleveland, Ohio, Oct. 17-21, its theme will be "Economy in Production" and all activities will in some manner stress this thought. Cleveland's Public Auditorium will house the approximately 350 exhibitors engaged in the production of metals, their treatment or fabrication, or in rendering services and supplying equipment to these industries. In addition, smaller auditoriums, meeting rooms, dining halls, and motion picture theaters have been reserved for technical discussions and special events.

The American Society for Metals; American Welding Society; Metals Branch, American Institute of Mining and Metallurgical Engineers; and Society for Non-Destructive Testing—all sponsors of the Metal Show—have scheduled many special features. There will be round-table discussions on the show's theme "Economy in Production" each day, Monday through Friday. Then there will be the "Economy Theater" which will enable exhibitors having motion pictures related to the show's theme to show these films. Regular schedules of these films will be published during the week of the show.

The American Welding Society and the American Society for Metals will hold morning, afternoon and evening sessions throughout the week. The Metals Branch, American Institute of Mining and Metallurgical Engineers will have daily and evening sessions Monday through Wednesday. The Society for Non-Destructive Testing has scheduled morning and afternoon technical sessions on Wednesday and Thursday.

On Saturday and Sunday, Oct. 15 and 16, the American Society for Metals will sponsor seminar sessions on thermodynamics in physical metallurgy. These technical meetings will be held in the Hotel Statler at Cleveland.

The fourth Metallographic display of the ASM will be a permanent exhibit during the week of the Metal Show. Micrograph studies of iron and steel, non-ferrous metals, and many others will be shown. Prizes will be awarded in each of a dozen classifications, and honorable mentions will be given to those entries which closely approach the winners in excellence.

Three top awards will be presented at the ASM's annual dinner which will be held Thursday, Oct. 20. The Sauveur Achievement Award will be presented to Dr. Marcus A. Grossmann, director of research, Carnegie-Illinois Steel Corp. The purpose of the Award is to recognize pioneering metallurgical achievements which have stimulated organized work along similar lines to such an extent that a marked basic advance has been made in metallurgical knowledge. Dr. Grossmann will be the thirteenth metal scientist to receive the Award since it was first established and presented in 1934 to Dr. Albert Sauveur, the late Harvard professor, and widely known as the "Dean of American Metallurgists." Dr. Edgar Collins Bain, vice president, Carnegie-Illinois Steel Corp., will be the 1949 recipient of the American Society for Metals' Gold Medal. This Gold Medal was established in 1943 to

(Turn to page 100, please)

METALS

In Automobiles

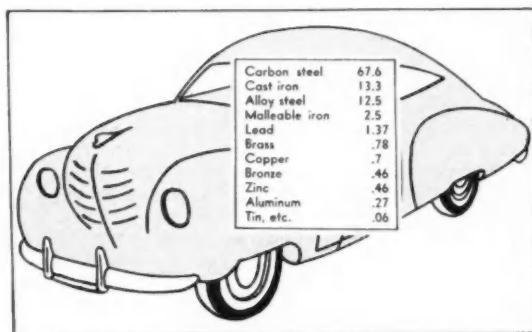
Carbon Steel Heads Ferrous Metals with 67 Per Cent and Lead the Non-Ferrous Metals with 1.4 Per Cent. This Article Describes the Various Applications of Lead in the Modern Passenger Car.

By **Kempton H. Roll**
Lead Industries Association

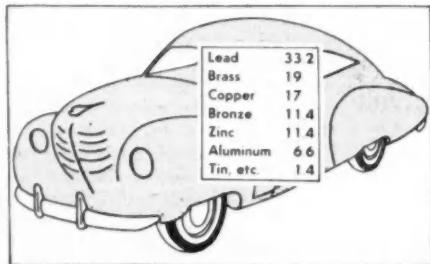
DISREGARDING iron and steel which constitute the bulk of the metals used in the construction of modern automobiles, lead averaging about 35 lb per car tops the list of the non-ferrous metals and alloys which include aluminum, brass, copper, bronze, tin and zinc. Of all the lead used in the average car, the greatest portion goes into the vehicle's reservoir of electrical energy, the lead-acid storage battery. There is a definite trend toward increasing the number of accessories and electrical equipment such as power operated windows, electric windshield wipers, ventilating fans, radios and telephones, extra lights both inside and out combined with increased candlepower as well as other devices yet to be made. The resultant demand for greater capacity batteries has meant a steady increase in the weight of lead per battery evidenced by a jump of about 15 per cent from 21.4 lb of lead per prewar battery to 24.6 lb in the first postwar batteries. Today the average auto-

mobile battery contains approximately 27 lb of lead more or less equally divided between antimonial lead (seven to 10 per cent antimony) and lead in the form of oxides—litharge, red lead and black oxide.

Next to the battery, the largest use for lead is in the form of solder which is divided into two types; body solder and solder used for joining. Modern meth-



*Percentage of All Metals
in Average Automobile*



*Percentage of Non-Ferrous Metals
in Average Automobile*

ods of pressing and fitting body panels have reduced the quantity of body solder needed in today's car contrasted with prewar models.

Because of the scarcities of tin during the war and subsequent Government restrictions against its unnecessary use, the tin content of body solders was decreased considerably and more lead used in its place. The new alloys were found to be so satisfactory that the automotive industry now has generally accepted

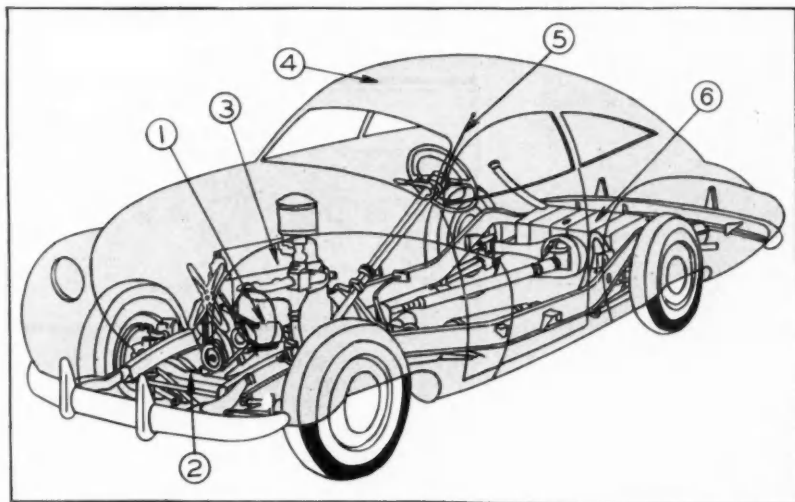
an alloy containing on the average 92 per cent lead, the balance divided between tin and antimony. Previously, compositions containing as low as 55 per cent lead were used. A still newer method of applying body solder is to use the same alloy in powdered form so that it may be built up more rapidly and with less wastage.

The solder used for joining purposes is for the most part concentrated in the manufacture of the radiator. Until recently the Government restricted the use of tin to an average of 32 per cent. Here again

base babbitts in long-wearing properties but when properly made they exhibit superior resistance to fatigue. Used as inserts, they may be made by casting on a formed steel backing or continuous steel strip or by sintering the powdered metals on a steel strip. The latter are rapidly superseding cast copper-lead alloys. The corrosion resistance of copper-lead bearings may be improved by plating with a corrosion resistant coating of lead-tin or similar alloy, up to 0.002 in. thickness.

A new development is shown in the use of composite bearings which consist of thin lead babbitt coatings on a matrix of copper and nickel powders sintered on a steel backing. Bearings made in this manner show very desirable characteristics with respect to both fatigue and corrosion resistance.

Bearings made by pressing and heating metal powders are often used



the restriction resulted in an increase in lead content for this type of solder and has led to the development of lead base solders containing considerably higher percentages of lead, in some cases eliminating the need for tin in quantities of more than 2 or 3 per cent.

Prior to the war, babbitts consisting essentially of tin served almost exclusively as the bearings for automobile engines. Since then, however, in many babbitts lead has taken the place of tin resulting in an alloy termed a lead-base babbitt.

Bearing and bushing alloys for automobile use cover a wide range of composition. The choice depends upon the requirements for fatigue and corrosion resistance which must be met, along with other conditions such as operating temperature, and access to lubrication. The method of bearing installation is also significant since some bearings may be used as inserts while others must become an integral part of the bearing journal. One of the reasons why lead-base babbitts have received rather widespread acceptance is due to their non-scoring and long-wearing properties. They also usually show good resistance to corrosion from the organic acids commonly found in lubricating oil.

Copper-lead bearings generally are inferior to lead-

Location of Lead Used in an Automobile

Key	Location	Per Cent
1	Battery and wiring system	74
2	Radiator and grille	8
3	Engine and clutch	7
4	Body	6
5	Accessories	2
6	Fuel tank and exhaust system	2
—	Miscellaneous	1

where self-lubrication, low coefficient of friction, dimensional accuracy, and simplicity of manufacture and installation are definite advantages. One type of oil-impregnated sintered metal powder bearing consists essentially of 82 to 88 per cent copper, 9 to 10 per cent tin and 2 to 4 per cent lead plus a maximum of 1.5 per cent graphite. Bearings made by powder metallurgy find application in the automobile as pedal bushings and clutch shaft pilot bearings, and as bearings.

(Turn to page 105, please)

FOLLOWING a period of well over a year of experimental production Detroit Diesel Engine Division, General Motors Corp., has in full operation a completely self-contained, mechanized line for finishing cylinder liners. Conservatively rated for an output of 100 liners an hour, it features a high production application of the Martempering process for controlled heat treatment. Although the heat treating department is located remotely from the machine shop, it is nevertheless an integral part of the self-contained line since it is linked by the same monorail conveyor. In addition to Martempering, the cylinder liner department boasts a number of innovations which set it apart as a unique example of advanced practice.

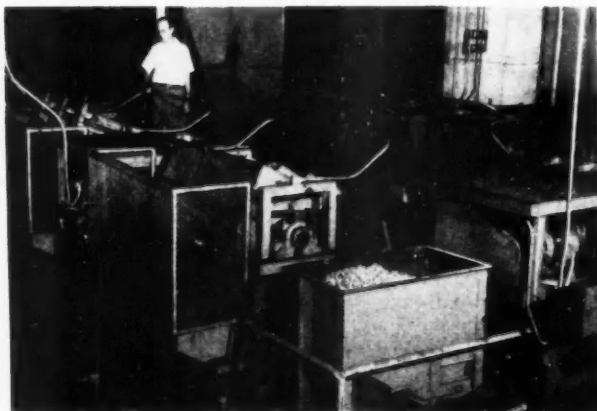
Castings are received from several sources and include both sand and centrifugal castings. Since the composition and structure of castings made by these methods differ in some respects, heat treatment is varied accordingly. Castings are normalized at the foundry source to produce readily machinable structures, maximum Brinell hardness being specified at 235. Minimum hardness of finished liners is held to Rc 45. Analysis of both types of castings is specified in the table at right.

The major events in the finishing of liners are

Machining 100 Diesel

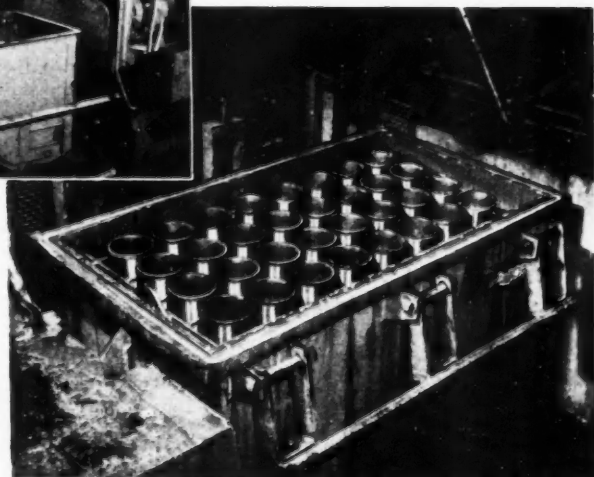
By Joseph Geschelin

	Sand Cast	Centrifugally Cast
Total carbon	3.25-3.50	3.10-3.40
Silicon	2.05-2.25	1.90-2.35
Sulphur	.12 max.	.12 max.
Phosphorus	.25 max.	.30 max.
Manganese	.55-.60	.60-.90
Copper	1.00-1.50	residual
Chromium	.55-.80	.15-.40
Nickel	.10-.25	.20-.45
Molybdenum		.10-.30



Above—View of the wet tumbling platform with tumbling barrels arranged about the conveyor underneath. The equipment for reconditioning granite stones after use may be seen in the far background.

Right—Method of loading tumbling barrels is shown in this closeup. The wet granite stones are placed within the individual liners.



divided into five distinct stages—rough machining; finish machining; Martempering; grinding, and honing. One of the most outstanding techniques introduced in this line is the use of a battery of Heald Bore-Matic machines tooled for precision turning of the OD and boring of the ID, simultaneously. By this means they

and Martempering Cylinder Blocks per Hour

Right—Heat treating department where liners are hardened and quenched in the Ajax-Hultgren salt bath unit. Liners come into the department on the monorail conveyor at left and are returned to the machine shop on the same conveyor.



Left—Boring and OD turning of cylinder sleeves is combined in one simultaneous operation on special Heald Bore-Matics, one of which is shown here. The massive boring bar may be seen in the foreground. The tool post for OD turning is directly in front of the operator as the machine bed. The liner is held securely in the chuck by the clamping flange.

have complete control of concentricity, wall thickness, and dimensional accuracy prior to Martempering. In turn, this enhances the control of distortion made possible by Martempering.

Another innovation is the adaptation of wet tumbling as a means of burring and polishing the central port belt on the inside. For this purpose liners are nested in a fixture within the tumbling barrel and packed with selected granite stones mixed with a soluble oil. The polishing and burring action is gentle and confined to the interior of the liner. Early experimental work proved that this treatment also enhances the surface finish of the bore about five microinches (rms). Consequently, the honing operation immediately preceding tumbling is arranged to produce a surface finish correspondingly coarser so as to meet surface finish specifications after tumbling.

Liners as cast are cylindrical in form with a thick wall to permit the formation of the flange at the top end, and sufficiently long to provide for finish cutting to length. First roughing operation is the centering

of both ends for holding in the initial rough-turning operations in Gisholt and Fay automatic lathes. These machines are fitted with multiple-tool holders, using solid triangular carbide bits. It is of interest to note that the solid bits provide six new cutting edges before regrinding is necessary.

The operation on the automatics is to rough-turn the OD and flange faces to length, chamfer top and bottom faces, and undercut the flange and clamping notch. An important feature at this point is the formation of the clamping flange above the regular liner flange so as to provide the means for positive clamping in succeeding operations. Later on, as will be noted, the clamping flange is cut off.

Then follows rough grinding of the OD in a Cincinnati Centerless grinder and rough-boring of the ID in three- and four-spindle vertical boring machines.

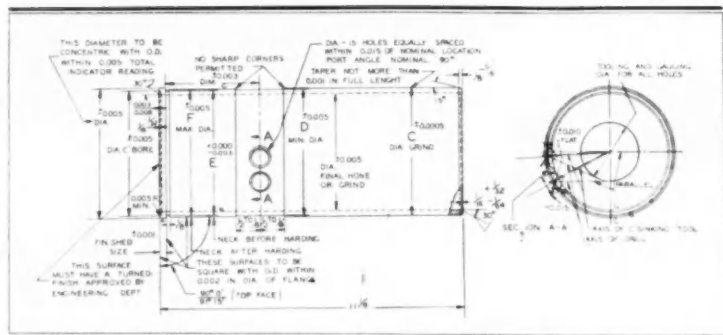
At this stage the liners are ready for the self-contained and mechanized final machine line. Finish-machining begins with simultaneous precision boring and OD turning in a battery of eight special Heald

Bore-Matics. Here the liner is clamped in a special chuck on the clamping flange to permit the work to be held securely. As illustrated, the combination tool bar is fitted with three single-point cutters. One cutter is used for turning the OD, while two fly cutters are used for boring. The latter are equally spaced about the OD cutter so as to equalize cutting forces.

Then the liners go to a battery of Monarch and LeBlond lathes for turning the port band, chamfering, and turning the flange undercut. This setting also is used to remove the clamping flange—required for the preceding operation—and scroll-finishing the flange. Work is then moved to another lathe for chamfering the ID at both ends. Flange thickness is

draw for one hour at 375 F in a continuous draw furnace. Last step in heat treatment is to anneal the flange end for a definite distance. This is done by selective induction heating in a Thermonic unit.

For the fourth and last stage the hardened liners enter the finish-grinding and honing operations. First the OD is finish-ground in a battery of four large Cincinnati Centerless grinders; then the bore is ground in a row of Heald internal centerless grinders. Final step is double-honing of the ground bore—first finishing to size, then honing to the required surface finish. As mentioned earlier, the surface finish in microinches (rms) is so adjusted as to leave five microinches to be completed in the tumbling operation.



Tolerances are shown in these views of the cylinder liner although actual dimensions are represented by letters or are omitted. After final hone or grind, taper of ID is held to not more than 0.001 in. in full length and ID runout is held to not more than 0.002 in. total indicator reading when liner OD is held in circular inspection fixture.

held to 0.001 in. with no dimensional change after Martempering.

Next step is the drilling of 15 port holes. This is done in a battery of five-head machines with heads arranged radially about the central fixture, as illustrated. Production machines for this purpose are provided with an automatic indexing device to facilitate indexing of the work three times to complete the belt of 15 holes. This is followed by chamfering the port holes in a single-spindle drill.

The third major stage in the process is Martempering. Machined liners are placed in trays on the conveyor and transported to the heat treating department. In Martempering the work is handled in a battery of two Ajax-Hultgren salt bath units, each one having a high heat stage and a salt quenching bath immediately adjacent. Martempering requires work to be thoroughly heated in a neutral salt bath at austenitizing temperature which, in this case, varies with the origin of the casting. Generally speaking, the temperature range is around 1600 F and work is held at this temperature for five minutes. As liners are removed from the hi-heat bath they are immediately placed in the quench tank where they are isothermally quenched for one minute in a violently agitated salt bath held at 480 F.

Then the work is allowed to air cool down to room temperature. This is followed by washing; then a

Wet tumbling is the last formal operation. As described earlier, liners are loaded on fixtures in the barrels and filled with granite stones of graded size, mixed with a soluble oil. After tumbling the barrels are completely discharged and the granite stones drop onto an apron conveyor below the platform on which the barrels are mounted. The conveyor transports the material to a tower at one end of the platform where the granite stones are cleaned and graded and ready for reuse. The soluble oil, in this instance, serves as a rustproof coating while liners are in process.

Finally the liners are inspected 100 per cent in the P & W Air-O-Limit gage. The gage is so designed as to give simultaneous readings of OD and bore—readings being taken on four gages, two for each dimension. One gage of each group gives the actual dimension, the other gives an average reading. All liners are subjected to Magnaflux inspection before acceptance.

A drawing of the "71" liner has been reproduced here to show the nature of dimensional tolerances and the specific instructions for holding certain critical elements to specifications.

Last but not least, the monorail conveyor system links the entire operation from start to finish. Each of the closely spaced hangers carries a group of four trays, each tray holding two liners. Thus each hanger carries eight liners at a time. The developed length of this conveyor line is about 466 ft.



This die assembly used by Doehler-Jarvis for producing experimental aluminum die-cast inner door frames for Kaiser-Frazer weighs 13 tons and has a surface area of about 1200 sq in. Below is the experimental aluminum die casting for the inner door panel for Kaiser-Frazer. It weighs about 12 lb trimmed, 13½ lb as cast, and requires a charge of about 18 lb of metal for the machine. It replaces at least four steel stampings.

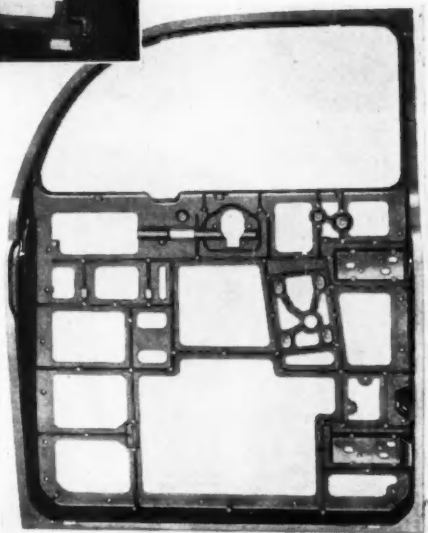
Progress Report on Die-Cast Body Parts

IN AN interview with Clay P. Bedford, executive vice-president, Kaiser-Frazer Corp., it was learned that the recent disclosure of aluminum die-cast door frames was intended primarily as a progress report on a continuing research project which has been under study for a number of years.

The aluminum die-cast inner door frame has been developed jointly with Doehler-Jarvis and is currently in experimental production on the two rear doors of the standard sedan. About 40 doors have been installed in cars operating in various parts of the country and K-F expects to have at least 100 units installed in cars on the road.

However, the present experimental door is not intended for production use in current models and will not be used in regular production. As a matter of fact, the field experience now being accumulated will serve as a guide in creating die-cast inner door panels for new bodies whenever a radical styling change is made in the future. By that time Doehler-Jarvis will have had the necessary production experience so essential to proper design treatment, die design, and casting techniques.

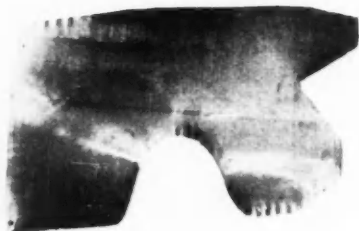
In addition to the door panel, K-F is conducting concurrent studies of several other large aluminum die-castings for use in the body. These include an instrument panel, trunk lid inner panel, and door frame.



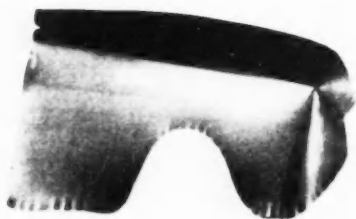
With regard to the last named item, it is felt that the die-cast inner door panel used in conjunction with a die-cast door frame will provide a natural combination. The door panel will provide, for the first time, completely interchangeable door assemblies, having accurate dimensional control. This feature eliminates the usually troublesome and time-consuming operations of door fitting, hinge mounting and hanging. If hinge mounting can be accurately controlled it will eliminate one of the costly operations on the body-in-white line. Moreover, fidelity of door fitting should eliminate leaks, simplify door sealing, and create improved appearance externally.

On the other hand, even if the door fit is of precision character, the door opening still remains as an element of variability at assembly. Hence the desirability of an equally precision-type permanent door frame to match the door. While the design of an acceptable door frame has not been finalized, K-F

(Turn to page 78, please)



This group shows the three major stages of producing the Pontiac front fender by the new method described in the text. "A" is a view of the notched blank prepared for the welding machine; "B" shows the blank after gathering and seam welding; and "C" is the fender as it comes out of the drawing press. The seam weld at the nose can be seen plainly in this view.



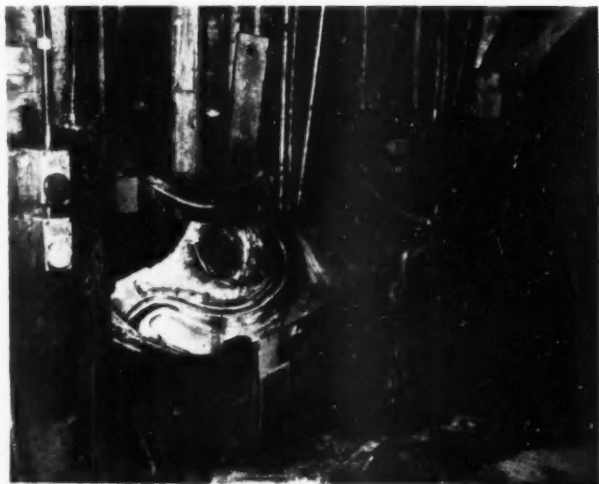
New Method Simplifies Drawing of Front Fenders

DRAWING of front fenders has presented an increasingly serious problem for many years, because of the enormous elongation at the nose section, taxing the ability of even fine deep-drawing steel to stretch during plastic flow without breakage or flaws. The problem has been met in the past by various expedients, one of the simplest

but not necessarily lowest cost being the development of front fenders in two separate stampings welded together along the longitudinal seam.

In recent months Pontiac Motor Division has placed in operation a truly revolutionary method which offers not only a practical solution of this troublesome problem but has actually simplified the entire technique of fabricating front fenders.

The basic feature of the new technique is found in the preliminary



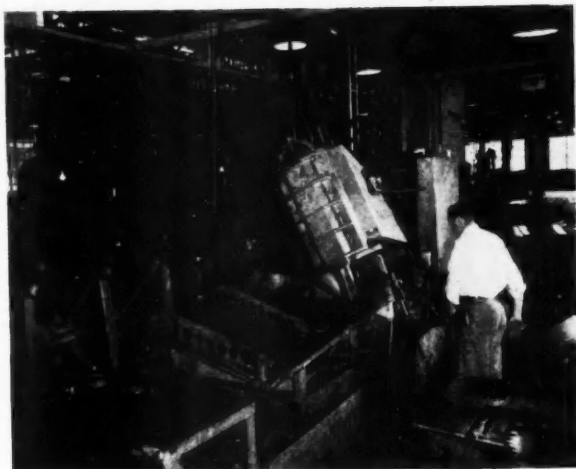
Simplicity of the die equipment for front fenders made by the new method is exemplified by this closeup of the die in place in the big Hamilton press.

formation of the nose section in the blank and before the blank is presented to the drawing die. The product illustration shows the notched blank required for this process, the nosed formation, and the finished fender stamping produced in one stage in a large double-action Hamilton press.

Formation of the nose is accomplished in a special machine illustrated here, incorporating a National seam welder. For this operation, the blank is placed in the machine and the notched end is brought together and gathered into a conical formation as shown in the product group. At the completion of nosing, which is done by means of a vertically moving ram, the seam welding roll is traversed upwardly while guided by a track to weld the joint securely.

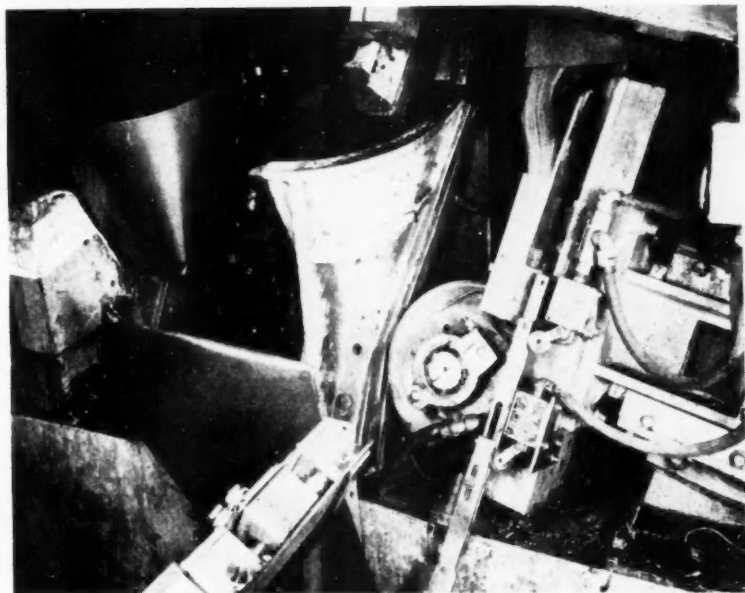
Contrary to conventional practice only a single drawing operation is then required to produce the fender. This is done in the double-action Hamilton press with a set of relatively simple dies and at a high rate of speed. The unique feature of the latter operation is that the pre-development of the nose eliminates the usual requirement of deep drawing. Instead they now have a relatively shallow draw with a corresponding reduction in blankholder pressure.

This, in turn, yields another major economy. With shallow draw and low blankholder pressure the excess stock customarily required for the blankholder is reduced to the very minimum. In fact it is feasible to use part of the nose section for the blankholder area without scratching or other damage because the pressure is so low. Summed up these features result in a reduction in blank size and a consequent saving of steel with a large reduction in scrap.



Here is a perspective view of the gathering and welding machine for front fenders. As shown, the blank is in position and held by the clamps while the ram at the extreme right is completing the gathering of the notched end.

With the new process there are actually only three major steps—blanking, nosing, and drawing. The only other operations required to produce a finished front fender are details of trimming, notching, piercing, etc., which are done in simple setups in small presses.



The opposite end of the gathering machine, seen in close-up here, contains the National seam welding head which automatically welds the gathered joint. At the left is a finish-welded blank ready for the press operation.

Emphasis on

Turbine Power

at

Britain's Aircraft Show



De Havilland 36-passenger Comet, world's first all-jet passenger plane. Its speed is estimated at 500 mph.

By W. F. Bradley

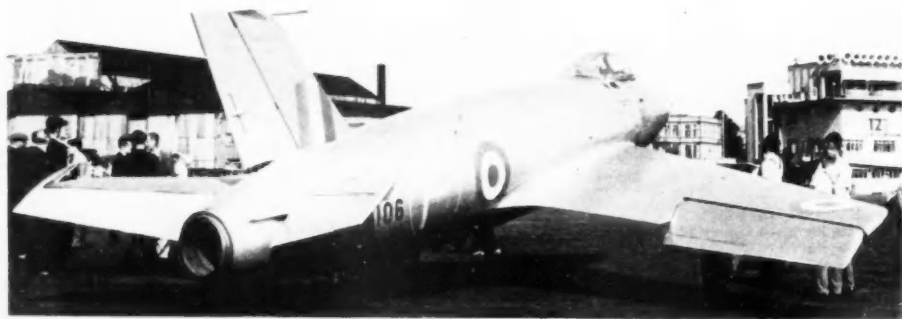
*Special European Correspondent for
AUTOMOTIVE INDUSTRIES*

LONDON, ENGLAND

PURE jets and propeller turbines were features of the outstanding tenth aeronautical display held recently by the Society of British Aircraft Constructors at Farnborough. Of the 39 planes which were demonstrated before a large international crowd, 16 were powered by either propeller or jet turbines, and 23 were equipped with piston engines. Coincident with this public display was the appearance of the

Brabazon, Britain's \$50 million air liner which by reason of its successful initial flights has done much to raise the prestige of the British aeronautical industry.

Immense interest was shown in the De Havilland 36-passenger Comet jet airliner which made its first flight on July 27 of this year, fitted with four Ghost jet engines, each of which is rated at 5000 lb static thrust. Development work will continue, and although it is not expected that the Comet will be in regular passenger-carrying service before 1952 or 1953, it stands out as the world's first jet airliner. Its top speed is estimated at 500 mph. Practically no technical informa-



Vickers-Supermarine P51. This plane is said to be capable of supersonic speeds.

tion is available regarding the Comet. It is of very pure aerodynamic form, with sweptback wings, the turbine engines being in the wing roots and almost buried in the relatively thin wing. The makers emphasize that wing loading is low, being less than in some conventional liners already in service. Its take-off qualities are similar to those of present-day transports, so that normal runways are sufficient.

Propeller turbine passenger planes were represented by the Vickers-Armstrong Viscount with four Rolls Royce Dart engines; the Handley-Page Hermes V with four Bristol Theseus propeller turbines; the Handley-Page Miles Marathon with two Armstrong-Siddeley Mamba turbines; the Avro Python-Lancaster, a modified Lancaster fitted with two Armstrong-Siddeley Python propeller turbines and two Rolls Royce Merlin piston engines, and the Apollo with four Armstrong-Siddeley Mamba propeller turbines.



The Wyvern TF-2 is equipped with two four-blade, counter-rotating propellers. Acme photo.

Several new military jet machines were presented, without any detailed information being issued regarding their features or performance. An impressive new jet bomber—the first in England—was the Canberra, built by the English Electric Co. A mid-wing monoplane with two Rolls Royce Avon axial-flow turbines, it did maneuvers usually associated with the fighter, but probably was not flown at its maximum speed.

Some of the British jet fighters were removed from (Turn to page 70, please)



Here is the new de Havilland Venom D.H. 112 single-seater, high-altitude fighter, developed from the Vampire and powered by the de Havilland Ghost engine. The engine is 66 per cent more powerful than the Goblin, yet does not require a fuselage of greater diameter. A feature of the Venom is the adoption of wing-tip fuel tanks which can be jettisoned if necessary. These tanks have little effect on performance of the plane and need not be jettisoned in combat if they still contain fuel. The Ghost engine fitted to the Venom is at present rated at 5000 lb static thrust.



Gloster Meteor powered by two Derwent V engines and fitted with after-burning tubes.



Rolls Royce Avon-Meteor. Its large nacelles house Avon engines incorporating the after-burning system.



England's first jet bomber, the Canberra. It is powered by two Rolls Royce axial-flow turbines.



De Havilland DH 113 Vampire night fighter. Note the wing-root air ducts which lead to the impeller of its improved D.H. Goblin engine.

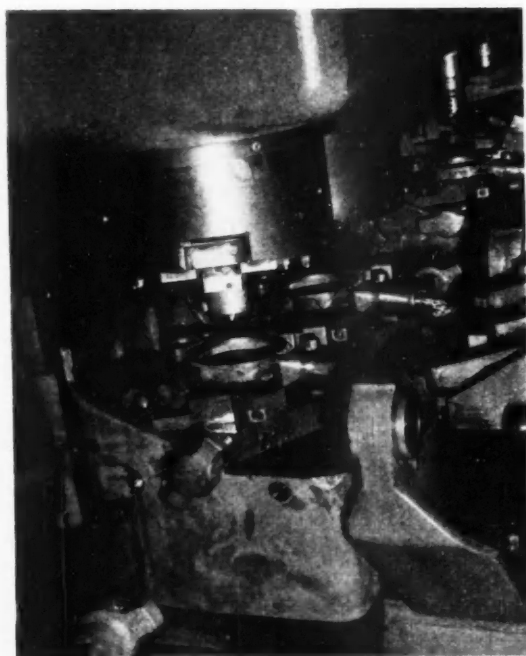
IN a program designed to convert its manufacturing facilities to transfer machine lines wherever product design and volume justify, Buick has found many outstanding advantages in this type of equipment. The most recent transfer line to be placed in regular production is an integrated 12-station Greenlee unit for machining completely the water pump body.

Up to the present time water pump bodies have been machined in a series of individual setups in a group of some 10 machines. More recently, when it was necessary to tool for another water pump body, the project was found to entail the introduction of perhaps five or six additional new machines.

The Greenlee transfer machine was then conceived as a means of simplifying the whole machine cycle, increasing productivity materially, reducing floor space, and reducing labor supervision and handling of parts to the very minimum. The fixtures for this machine line are capable of holding both type of pump bodies, thus making it possible to run both pumps over the same line with the minimum of down time. As a matter of fact, the change-over from one type to the other can be accomplished in less than two hours. Both pumps are similar in all respects except for several drilled and tapped mounting holes.

The first step on the line is to load two castings into the fixture and start it into the machine. This series of operations is handled by two operators. Castings are located and clamped by hand in individual fixtures holding two parts at a time. These fixtures are quite unique. They have a system of reversible clamps for holding the two types of castings and incorporate two sets of locators for the same purpose. That they are extremely massive and rigid to assure dimensional accuracy may be gaged

Perspective of the Greenlee transfer machine line on Buick water pumps. At the left are the two operators at the first station, one operator in the act of loading two fixtures. Directly in the foreground is another fixture ready for loading. To the right in the background is the washer. Fixtures are washed while moving on the gravity roller conveyor while the work goes through on the monorail above.



Buick Converts to Transfer

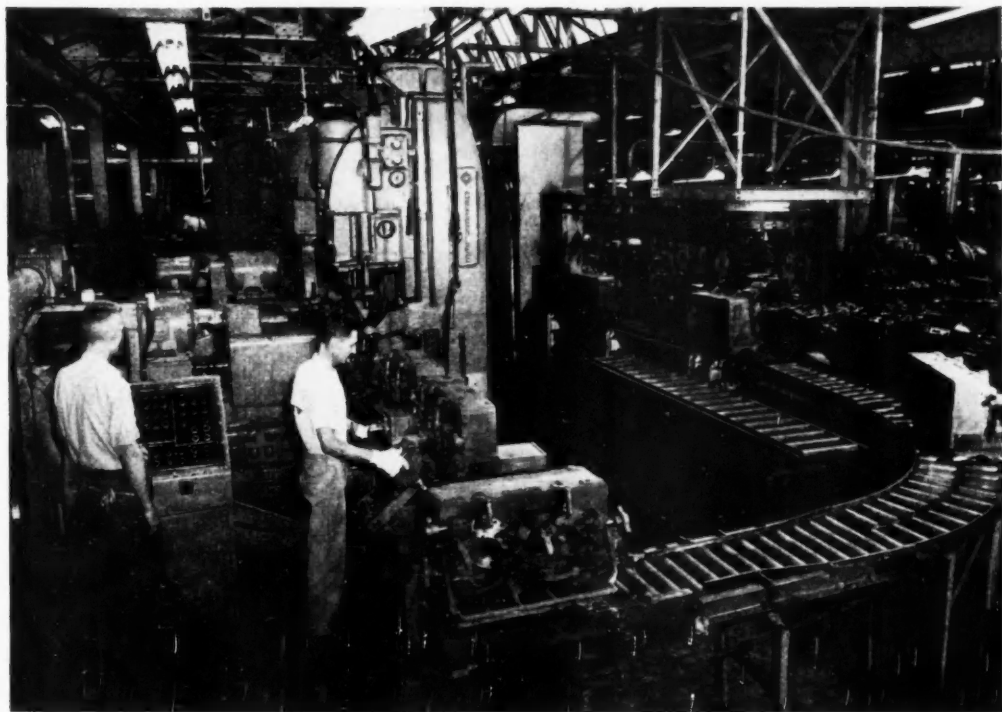
from the fact that each fixture weighs about 500 lb. The total weight of 20 of these fixtures that ride the conveyor line indicates the capacity and nature of the mechanism required to move the fixtures around the circuit.

The sequence of events in the machine can best be pictured by listing the specific operations at each station in Table One.

Inasmuch as these pump bodies are of cast iron, cemented-carbide tools of suitable grades are used for all facing, boring, and milling operations.

At the end of the line, as the work comes out of the machine, the fixtures ride around on a conveyor loop and go through a washing machine located parallel to the machine line. A single operator unclamps the work and

Closeup of one of the work stations on the Greenlee transfer machine. This is a boring head mentioned in the text.



Line for Water Pump Bodies

hangs it on an overhead conveyor. Fixtures then go through the washer for thorough cleaning prior to each use. At the same time the pump bodies go through the washer at a higher level.

Pump bodies then are transported to stock or to the assembly line while the fixture rides the conveyor to the start of the machine line. Because of their weight, fixtures have to be handled carefully and singly. As one fixture reaches the stop, a limit switch stops the fixture conveyor in the washer for a moment. Then when the fixture has been removed by the operator, the limit switch restarts the conveyor to permit another fixture to ride to the stop.

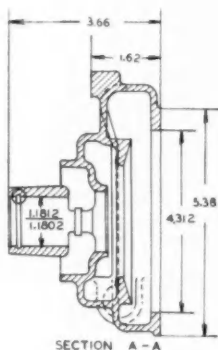
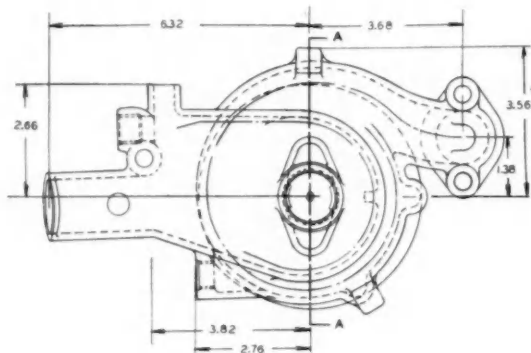
It is important to note that the transfer line reduces the handling of work to the very minimum and requires only three men for its operation—two at the loading and control end, and one at the end of the line.

Closely allied with the Greenlee line is a unique special machine built by W. F. & John

TABLE ONE

Station	Operation
1	Load
2	LH horizontal unit—rough-face cover and impeller faces RH vertical unit—drill and countersink two holes
3	LH horizontal unit—core drill and face seal hole and clearance RH vertical unit—idle (Note: This unit will be in operation on the other pump.)
4	LH horizontal unit—mill water outlet boss RH vertical unit—idle (Note: This unit will be operative on the other body.)
5	LH horizontal unit—finish-face cover and impeller faces RH horizontal unit—face and chamfer bearing
6	Conveyor space for inspection between stations
7	LH horizontal unit—drill three bolt holes and six cover holes RH horizontal unit—rough bore bearing hub
8	LH horizontal unit—countersink six cover holes and spotface mounting pad RH horizontal unit—semi-finish bore bearing hole
9	LH side angular unit—idle (used for other body) RH horizontal unit—cut two grooves in bearing hub
10	LH horizontal unit—finish-bore, chamfer, and face seal hole RH horizontal unit—finish-bore bearing hub
11	LH horizontal unit—tap six cover holes RH vertical unit—tap two pipe threads
12	Unload

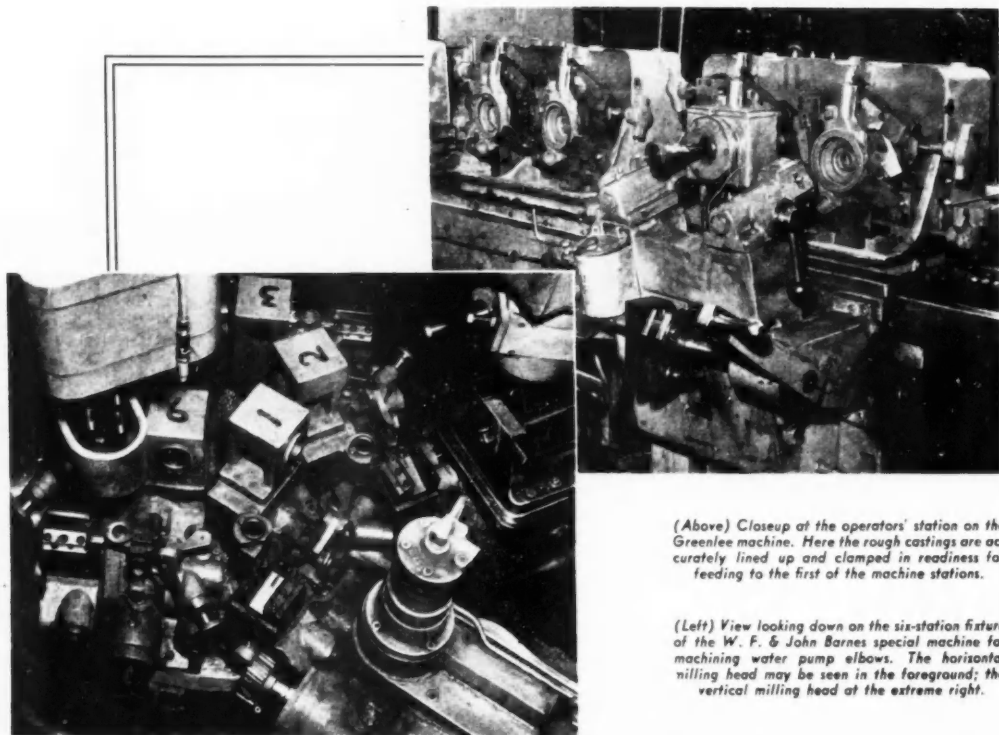
Body of the new Buick water pump. While the pumps are made in two models, the bodies are similar except for several drilled and tapped mounting holes.



Barnes for machining the right angle elbow which is required on water pumps for the new Series 40 and 50 models. The seemingly awkward operations of milling, drilling, and tapping of the two flanges at right angles to one another is done automatically in the five-head machine illustrated here. The central indexing fixture, holding six elbows at a time is the key to this oper-

ation on the two flanges in this machine.

In the sequence of events, the two flanges are milled successively at vertical and horizontal milling head stations. Similarly the holes in the flanges are drilled by means of vertical and horizontal drill heads. At the end of the cycle, the holes in one of the flanges are tapped.



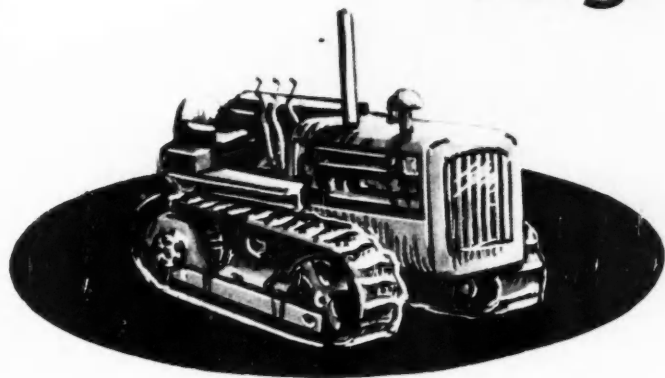
(Above) Closeup of the operators' station on the Greenlee machine. Here the rough castings are accurately lined up and clamped in readiness for feeding to the first of the machine stations.

(Left) View looking down on the six-station fixture of the W. F. & John Barnes special machine for machining water pump elbows. The horizontal milling head may be seen in the foreground; the vertical milling head at the extreme right.

A Warning Against Foreign Efforts to Cartelize Crude Rubber Supply, Discussions of Earth Moving Equipment Power, Induction Heating, Gear Drives, and Reports on Performance of Power Cranes and Shovels at SAE National Meeting in Milwaukee.



Tractor Highlights



A WARNING against the strenuous efforts abroad to cartelize crude rubber supply at the expense of the American public was sounded by John L. Collyer, president, The B. F. Goodrich Co., in his address before the SAE Tractor Meeting in Milwaukee in September. At the present time our country has a rated capacity of 750,000 long tons a year of man-made synthetic rubber, a substantial part of which is now held in reserve. But certain crude rubber producers would like to see the United States restrict consumption of synthetic rubber to 220,000 tons since that would be effective in raising crude rubber price levels, in Collyer's opinion.

The proving of "cold" rubber has been the most important recent advance, according to the speaker, producing a type of rubber more resistant to abrasion and particularly desirable for tire treads. By the end of this year "cold" rubber capacity will be at the rate of 200,000 tons a year. Another Goodrich new development is the puncture-sealing tubeless tire which is said to be available to 20 per cent of car owners. There is a possibility that this type of tire may have a place in the agricultural field as well. Tires for off-highway service promise a tremendous potential possibly as high as \$50 million a year, it is estimated. Some industry statistics mentioned by Mr. Collyer are well worth noting. For example, peak prewar consumption of rubber in 1940 was 650,000 tons. Postwar this rose

to over one million tons in 1946, 1947, and 1948, and is expected to be close to one million tons this year. This represents an increase of 50 per cent above the highest prewar rate. It is of interest that about 16 per cent of all rubber used in the U. S. goes into tires and tubes for farmer's vehicles and implements. Retail value of tires and tubes bought by American farmers this year is estimated around \$335 million.

Because of the vital role of rubber in our transportation system, it becomes a matter of national security to maintain the development and production of man-made rubber and thus enable this country to be relatively independent of crude rubber supply in the event of another emergency. Moreover, synthetic rubber production will remain our guarantee against cartelized price inflation, according to Collyer.

Capacity Attendance at Meetings

The technical meeting was an outstanding success from the standpoint of attendance and genuine interest. Total attendance was estimated at around 750 with capacity audiences at all sessions. Taking as his theme that hydraulic power mechanism has been responsible for the rapid development of earth moving equipment, E. J. Hrdlicka, vice-president, Hydraulic Equipment Co., described some examples of hydraulic power as applied on bulldozers, tractor

(Turn to page 82, please)

AIRBRIEFS



By ROBERT McLARREN

Air Race Indictment

For some unexplainable reason, there exists a large segment of the aviation industry, including its press, who belong to a "damn the National Air Races" fraternity. Every year, as regular as the calendar, they shout their chorus of "stop this blood bath" and similar chants of exhortation. They declare self-righteously that the air races harm aviation instead of promoting it. And they flash historical lists of the dead to prove their point. (All the deaths produced in 40 years of air racing don't equal a single hour's dead from traffic accidents!) Frankly we didn't know that the air races were ever obligated to sell flying to the public. It's a sport, pure and simple, and that's all. We don't think horseracing has ever sold a spectator on the merits of horseback riding nor the world-famed Indianapolis Races on the joys of driving an automobile. Those in aviation have for too long been convinced they are part of a "great cause" and that everyone must become a soldier in the campaign to "sell" aviation. Conversation with zealots over the past 40 years leaves the listener with the conviction that if he isn't "for" aviation he is its enemy! Anything involving motion involves risk, and the deliberate taking of risks is sport. Racing pilots are businessmen who take risks in exchange for cash prizes and hundreds of thousands of people pay to see them do it. On this basis we just can't see where "selling" or "harming" aviation comes into the matter at all. That a mother and her baby were killed in their own home during the 1949 National Air Races is, of course, a tragic and regrettable incident, but we are reasonably certain that any insurance company would gladly sell the citizens of Cleveland air race life insurance at rates measured in pennies.

Race's Technical Contribution

The basic problem of the racing pilot is to extract the maximum performance from his equipment and himself for a short time. That, in our humble opinion, is a wholly worthwhile endeavor. Cook Cleland, 1949 Thompson Trophy winner, obtains 4000 hp out of his early-model and well-worn Pratt & Whitney Wasp Major engine at a time when the latest production model of

that engine as installed on combat aircraft produces only 3500 hp! S. J. "Steve" Wittman turns his Continental C-85 engine up to 3600 rpm when the engine, as installed in a variety of personal aircraft, is rated at only 2575 rpm! He also has an airplane with a stock, unmodified Continental C-85 engine installed, that flies at better than 200 mph when the best personal aircraft powered by this identical engine can do no better than 125 mph! This sort of list is endless, but it is basically a list of research projects being conducted at the National Air Races without benefit of one penny of public funds. Such a comparison of racing with conventional service must contain several important qualifications, of course. But by showing both the manufacturer and the private owner such ultimate possibilities, the National Air Races are performing a vital technical service to aviation.

P&W Compound Engine

Two methods of turbine compounding, one by direct drive back into the crankshaft, the other by use of a jet nozzle, reached the procurement stage more than a year ago. The Wright Turbo-Cyclone, which uses the former system, was ordered in quantity by the Navy Bureau of Aeronautics for the Lockheed Neptune patrol bomber. The Pratt & Whitney Turbo-Wasp, which uses the latter system, was ordered in quantity by the Air Force for the Boeing B-54 bomber. However, while Wright Aeronautical Corp. has gone ahead into quantity production of its engine, Pratt & Whitney struck a snag that resulted in cancellation of the entire B-54 project together with its engines. Now Pratt & Whitney announces that after a year of intensive research and development they have not only licked the problems of the original 4000 hp design but have now produced a 5500 hp engine using the VDT (variable discharge turbine) system. The new engine uses an after-cooler, an improved variable-discharge system, and newly designed turbosuperchargers. These improvements permit the use of higher manifold pressures and the aftercooler lowers the carburetor air inlet temperature. Pratt & Whitney now believes the new engine capable of continuous operation at altitudes of better than 50,000 ft.

Air Force Cancels—Again

The U. S. Air Force, after costing the taxpayer about \$80 million through changing its mind, has done it again by cancelling an \$8 million contract with Fairchild for 100 T-31 primary trainers. This contract was approved by President Truman last January and came as the result of a long and arduous competition and evaluation of the Fairchild, Beech, TEMCO and other trainers, including flight tests at Wright Field. A year after the competition and ten months after award of the contract, the Air Force now decides that it doesn't want the airplanes after all! All of the work that Fairchild has done to date on the project will be paid for by the Air Force and it will run about one million dollars. It seems perfectly obvious that all of the money being saved by the merger of Army-Navy hospitals, the abolition of boards and committees (which didn't cost the taxpayer a penny anyway since they were served by regular officers!), the joint buying of underwear, etc., is being lost and much more by the kind of Air Force irresponsibility exemplified by contract changes. And it wouldn't surprise us a bit if the Air Force now turns around and buys the Beech T-34 Mentor on the basis of the magnificent exhibition of this airplane by "Bevo" Howard at the 1949 National Air Races.

Turbine Heat Solutions

Since the first announcement of successful jet propulsion in January, 1945, we have been told that the biggest problem facing the gas turbine designer is heat-resistant materials. While his announcement may be premature, it now appears that much of this problem has been solved. Scientists at the NACA Lewis Flight Propulsion Laboratory, Cleveland, recently revealed two important developments in this field. Ceramals, already widely discussed as a promising heat-resistant material for high-stress application, have now been joined by intermetallic chemical combinations displaying even more promising characteristics. NACA says that tests of molybdenum-disilicide reveal that it has good strength characteristics at temperatures as high as 3000 F. In addition, it is remarkably resistant to oxidation and, in addition, has a low density, which means low centrifugal stresses in turbine blading. Accompanying this news is results of tests on turbine blade cooling. Hollow blades containing finned internal passages through which air is pumped under pressure show a one-third reduction in temperature over conventional solid blades when heated to the same temperature. As an indication of what such temperatures can mean to a turboprop engine, for example, an increase from the present 1200 to 2000 F turbine inlet temperature would permit a 75 per cent power increase. An increase to 3000 F would increase the power 260 per cent!

356 Models in Dodge B Series Truck Line

WITH the introduction of its new B-2 Series "Job-Rated" line of trucks, Dodge has boosted the range of chassis selection to include 356 basic GVW models, ranging from 4250 to 23,000 lb GVW; and up to 40,000 lb gross combination weight. This compares with 248 GVW options in the previous B-1 Series. The line includes basic conventional chassis models—Power-Wagon, Dual Purpose models, C-O-E, C-O-E Dual Purpose models, school bus line and Route-Vans.

Part of this expansion stems from the broadening of the popular 1½-ton group which now contains three basic models comprising a total of 92 GVW ratings, ranging from 7000 to 16,250 lb, in a range of seven wheelbases. Added to the 1½-ton group are the 14 new models, including the four GA Dual purpose models.

Seven engines are provided in this line, including one new engine—for the R and RA models—having a maximum gross rating of 122 hp.

Important features continued on Dodge engines include the use of four piston rings with chrome plated top ring, exhaust valve inserts, and Silchrome exhaust valves. Silchrome intake valves are being applied to engines for the J and K models. Sodium-cooled exhaust valves are supplied as standard equipment on engines for the J and K models.

Engines for the

heavier R, T and V models are fitted with Silchrome valves for both intake and exhaust with the addition of Stellite facing of exhaust valves. Exhaust valves for these models are of sodium-cooled type. Both intake and exhaust valve seats on these engines are fitted with Silchrome inserts, the exhaust valve inserts being faced with Stellite.

Nominal truck ratings have been increased to include some 2¾ and 3½-ton models. External appearance on all models is unchanged basically.

On ½, ¾ and one-ton models engine power has been increased; and all have a new "Right Spot" hand pull type parking brake control located accessibly under the dash to the right of the steering column. A steering post gear shift lever also is standard on these models, cleaning up the cab and providing more room for three people in the front compartment. Rear loading height has been reduced on these models over 1 in. through a change in spring contour. The ½-ton pick-up offers a chance of two body heights—17 and 22 7/16 in.—to meet varying requirements.

Reputedly the first truck manufacturer to offer Cyclebonded brake linings as standard equipment on ½-tonners, Dodge now supplies bonded linings on all of the models in its line.

A new five-speed synchro-shift transmission is being offered as standard for
(Turn to page 76)

B-2 Series Dodge Engines CONDENSED SPECIFICATIONS

(Note: All engines L-head, six-cylinder type)

Truck Model	B-108 C-116	PW	D-116 D-126	F, G and H	All J and K	R, RA	All T and V
Bore (in.)	3¼	3¼	3¼	37/16	37/16	3¾	3¾
Stroke (in.)	4¾	4¾	4¾	4¼	4½	4¾	5
Displacement (cu in.)	217.8	230.2	230.2	236.6	250.6	306	331.4
Compression ratio	6.6 to 1	6.7 to 1	6.7 to 1	6.6 to 1	6.6 to 1	6.46 to 1	6.46 to 1
Max gross hp (rpm)	96 @ 3600	94 @ 3200	102 @ 3600	109 @ 3600	114 @ 3600	122 @ 3200	128 @ 3000
Max net hp (rpm)	82 @ 3600	78 @ 3200	83 @ 3200	91 @ 3200	98 @ 3200	105 @ 3000	111.5 @ 2800
Max gross torque (rpm)	172 @ 1200	186 @ 1200	187 @ 1200	192 @ 1200	204 @ 1200	245 @ 1200	270 @ 1200
Max net torque (rpm)	165 @ 1200	177 @ 1200	179 @ 1200	180 @ 1200	192 @ 1400	233 @ 1200	257 @ 1200
Number main bearings	4	4	4	4	4	7	7

Improved Method of Size Control For External Grinding

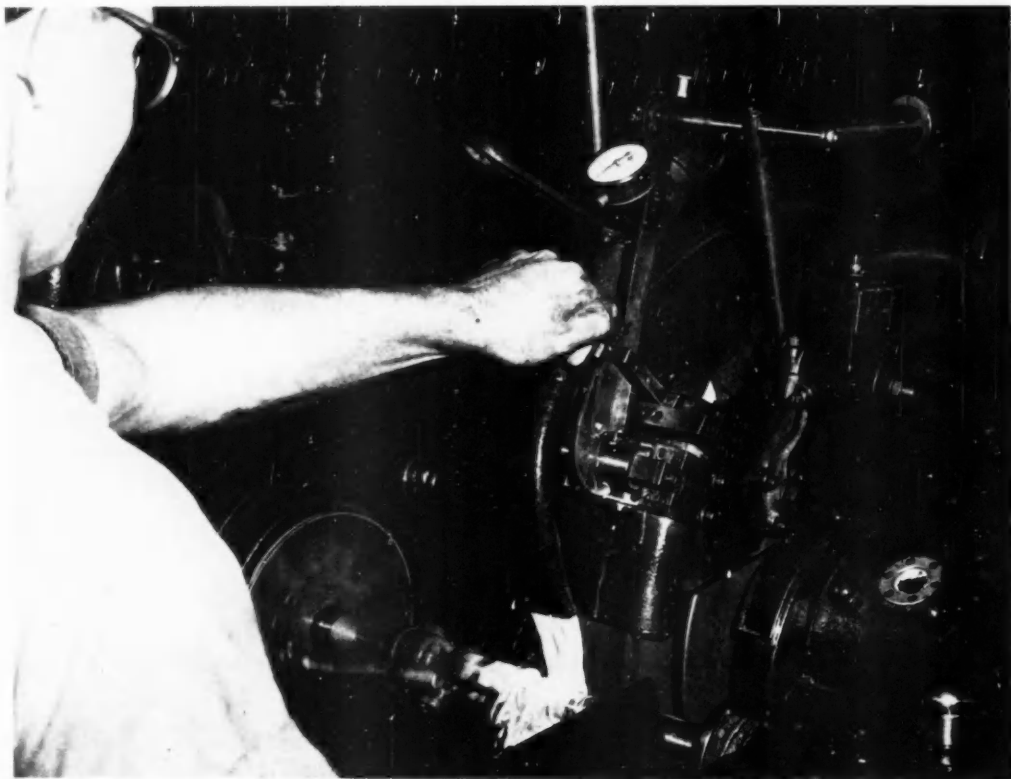
TWO separate principles of process control to produce a measuring procedure for external grinding operations were combined recently at the Indianapolis Truck Engine Works of International Harvester Co. This procedure (1) makes possible accurate grinding to close tolerances on a production basis, (2) has eliminated scrap and rework, (3) has reduced inspection checking to random sampling, and (4) has made unnecessary any manual gaging by the production operator except for periodic checks for taper after dressing or changing the wheel.

The two principles are the use of a standard Arnold gage, which is a device for constantly measuring the size of an external diameter while grinding, and the use of a master diameter for setting the indicator zero to a fixed size, usually the mean dimension.

As shown in the illustration, the master diameter revolves about an axis to minimize wear and can be moved longitudinally as it wears. It is mounted directly on the wheel guard so that when the operator removes the Arnold gage from the work it rests on the master and a reference between the indicator zero and the master is automatically obtained.

The master is mounted so that its OD surface is parallel with the axis rotation of the work, and a guide is provided to establish the same angular position of the gage fingers each time the gage is set on the master.

So long as the operator breaks the feed mechanism at the desired indicator reading any given size can be reproduced within ± 0.0001 in. without difficulty, according to report of the company.



Shown here is the use of the master for setting indicator to fixed size. Note the guide for controlling angularity of the gaging fingers. A spring-loaded ball in the guide arm permits a wide enough slot for free entrance of the gage without losing the correct location.

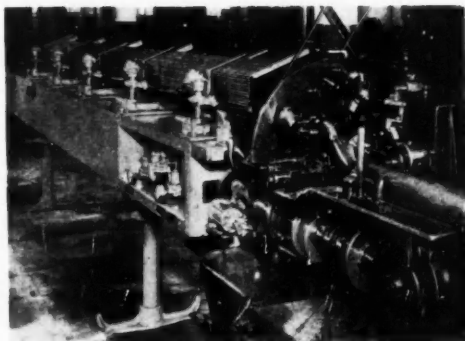
E-56—Pneumatic Bar Feed

Fully automatic magazine loading pneumatic bar feeds for increasing screw machine output up to 60 per cent or more have been tried and proved in the field for six months by the Lipe-Rollway Corp., Syracuse, N. Y. The magazine holds a normal 8-hr day run of stock comprising 19 1/2 in. bars to 96 1/2 in. bars. By time study the time to load the magazine from nearby stockpiles is said to average 100 seconds.

The magazine feeds the entire stock bar to the last work piece length using no feed fingers, and ejects the end



For additional information regarding any of these items, please use coupon on page 54



Lipe-Rollway fully automatic magazine loading pneumatic bar feed.

remnant without operator attention. No idle machine time is required to load stock bar nor to locate the bar end for the first cut-off operation.

When the stock bar in the machine collet is used up to the last remaining end remnant, a machine clutch is disengaged automatically and the machine tool cycle stops with the spindle revolving and collet open. Immediately the bar feed stock pusher feeds a new stock bar through the collet, and ejects the end piece or remnant of the previous stock bar. Stock bars may vary from 3 in. over standard 12 ft length to 2 ft less in length without impairing smooth, automatic operation. Work piece length may be set for any single feed-out up to 16 in. in length without rebound of the stock bar from the stop. Entire reloading and positioning of the bar for the first cut requires approximately 4 seconds.

Up to 8 or 10 machines may be handled by one operator.

E-57—Lathe for Large Diameter Work

For machining large diameter work not excessively heavy, a 16/24 in. lathe having sixteen spindle speeds ranging from 11 rpm to 727 rpm, is a new product of the South Bend Lathe Works, South Bend, Ind.

Maximum swing over the carriage is

24 1/4 in.; over saddle cross slide with chip guard is 18 3/4 in.; and over cross slide without chip guard is 19 1/4 in. Distance between centers varies from 30 in. to 102 in., depending on length of bed. Power longitudinal feeds range from 0.0015 in. to 0.0841 in.; cross-feeds from 0.0006 in. to 0.0312 in. Full quick change gear mechanism provides 48 pitches of screw threads ranging from 4 to 224 per in., right or left hand.

Large capacity of the lathe fits it for general purpose precision work on large diameter jobs, such as boring jig plates, turning and boring wheels, machining pulleys, brake drums, etc. The lathe is also said to be not too cumbersome for operation on small parts.

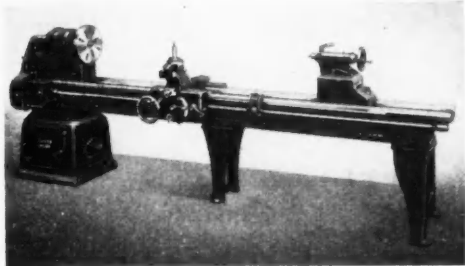
A two-speed 2-1 hp motor is mounted in the cabinet leg underneath the headstock. Power is transmitted by a belt

up through the lathe bed to the headstock cone pulley. Direct belt drive to the spindle eliminates possibility of gear vibration at high speeds. Slow speeds are driven through back gears. A six station motor control provides push button selection of high and low speeds in both forward and reverse. This permits changing quickly from low speed to high speed, convenient when roughing and finishing cuts are taken with the same tool, or when a large diameter and a small diameter on the same part are machined consecutively. The instant reversing feature also saves much time on thread cutting and tapping operations.

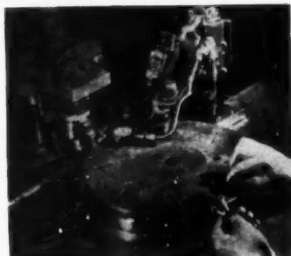
E-58—Punch Press Feeding Device

Addition to the line of the V & O Press Co., Hudson, N. Y. (division of Rockwell Mfg. Co.) is a punch press feeding device purchased with patents and other facilities from the Covert Mfg. Co., Troy, N. Y.

Now called the V & O Feed-O-Matic, the machine is for attachment to punch presses or other machine tools. By means of a mechanical hand or a vacuum pickup the machine transfers a part from a nesting plate and places it in a standard punch press die. As the mechanical hand returns for the next piece, it automatically trips the press



South Bend 16-speed 24-in. swing lathe.



V & O Press Co.'s punch press feeding device, the Feed-O-Matic

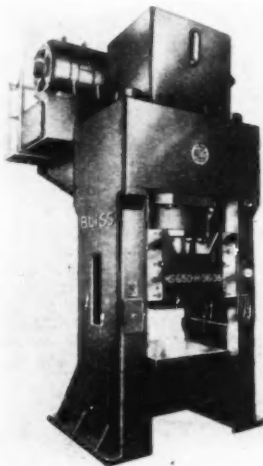
and the finished part is ejected from the die. The operator's hand is said never to be under the punch or in danger. (Turn to page 48, please)

The mechanical hand places the blanks accurately in the die, the moving arm having a micro-switch safety feature to prevent tripping of the press unless the blank is correctly placed.

Built in six sizes, the Feed-O-Matic can be attached to any make press and is adapted for placing pieces into position for machine tool operation.

E-59—Simplified Hydraulic Press

First of a new series of simplified hydraulic presses has been developed by E. W. Bliss Co., Toledo, Ohio, as exemplified in their 650-ton single ac-



Bliss simplified single action hydraulic press, model H.S. 650-H-36-36

tion press, representative of standards applying to both single action and double action types.

Design changes include a simplified circuit and use of a dual flow pumping system; major reduction in amount of piping and valves; a unit design for frame, cylinder, and slide; prestressed tie rod frame; four adjustable flat type Meehanite gibs having removable wear strips on uprights; foot valve directly connected to the cylinder; no interconnecting piping; and open type prefill valve.

The pump design permits reversing of oil flow, which provides a controlled gravity descent with smooth starting and stopping as well as smooth release of pressure at the end of the pressure stroke. No shocks or surges maintain.

This 650-ton Bliss press was recently installed in a midwest plant and is used to compress and size the new rivetless type of brake lining for automobiles. The press was specially arranged with a timer for dwell and pressure compensation on the pump to reduce the pump stroke during the dwell period.

NEW Production and Plant EQUIPMENT

For additional information regarding any of these items, please use coupon on page 54

E-60—Automatic Contour Arm

Demonstrating "Economy in Production" during the National Metals Congress, Cleveland, Oct. 17 to 21, a new machine tool named the Contour-matic—announced by the DoAll Co., Des Plaines, Ill.—provides fast precision cutting of any material during a repetitive production cycle, through push-button control instead of handwheels.

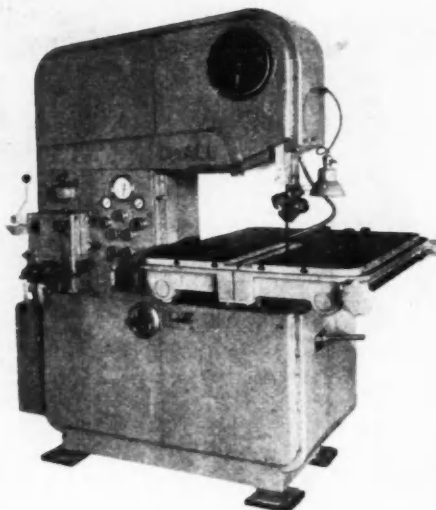
This "package" product, requiring

in the fixture, the machine started, and the cut made without further attention. At the end of stroke the table advance turns itself off, enabling one man to handle a dozen or more machines making heavy cuts. For any type and thickness of material the table feed equalizer is adjusted to apply correct pressure against the blade. Hydraulic power for tilting the work table 45 deg to right and 10 deg to the left, permits compound bevel cutting.

Saw guide post is hydraulically adjustable by valve control instead of by manual handwheel. The proper guide can be brought into position by rotating the turrets mounted above and below the work table. Turrets hold three different guide assemblies for both high and low speed sawing with insert and roller type guides. Correct blade tension for width of blade is maintained by hydraulics and indicated on a dial.

A limit switch instantly opens the power line and automatically applies disc brakes on both wheels so that there is no coasting when power is turned off and no runaway when a blade breaks. Blade velocity from a low of 40 fpm to the high of 10,000 fpm is provided in a three speed gear shift transmission coupled with a stepless variable speed pulley. Power for both

DoAll automatic contour saw, the Contour-matic, Model MP-20.



no auxiliary table, simplifies make-ready since the table can slide hydraulically 16 in. on ways as large as locomotive piston rods. Jigs and fixtures are secured, not by clamps, but by hex. head bolts slipped into any of four T slots which run the length of the table, front to back. Bolts never need be removed from the jigs.

Feed mechanism being part of the table, production work can be locked

saw and hydraulic pump is obtained from a single 7½ hp motor, made possible by employment of anti-friction bearings throughout.

Besides saws, the Contour-matic accommodates file bands, abrasive belts and polishing cloths. With this "package" machine, the manufacturer states, the motor does the work; not the operator.

(Turn to page 50, please)

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METALLURGY SALES OPERATIONS

E-61—Universal Broaching Machine

A line of low-cost universal ram-type hydraulic broaching machines being marketed by Colonial Broach Co., Detroit, Mich., and called Ram-Press, may be used interchangeably for all conventional broaching operations, including surface broaching, internal push-broaching, slotting, and press-work. Machines are available in 4, 6 and 10 ton capacities having 24- and 36-in. strokes.

The hydraulic system provides excess capacity for occasional overloads. Cylinder construction simplifies maintenance and enables replacement of cylinders separately from the ram. A simplified hydraulic hook-up eliminates cored passages in the machine leading to the cylinder. Piston rods for operating the ram are located in a protected position and are never exposed to accumulation of chips or foreign matter, further eliminating chance of leaks and providing protection for the cylinder packing. Pistons are of close grain cast iron with automotive type rings for long life.

The coolant system has its own separately motorized impeller type pump, eliminating belts, pulleys, etc. Separate start and stop controls are provided for the coolant and hydraulic pumps. Stroke adjustments can be quickly and accurately made by means



Universal broaching machine offered by Colonial Broach Co.

of externally located collars on trip rod located alongside of the ram. These controls provide automatic stopping of the machine at top and bottom of strokes.

A large bracket, bolted to the ram face is designed for use of internal push-broaching and for single or multiple assembly and press-work, etc. Machines can be furnished with special circuits for operating reeding tables or fixtures. Special circuits can be furnished for automatic clamping.



For additional information regarding any of these items, please use coupon on page 54

E-62—Adjustable Punch Tools

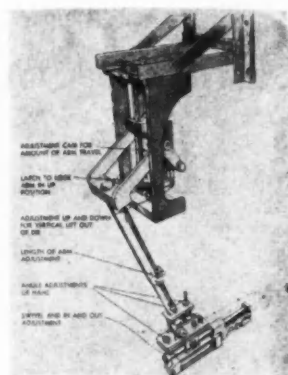
The Beatty Machine & Mfg. Co., Hammond, Ind., is furnishing a new, adjustable set of punch tools for punching webs of beams and channels, and for punching legs of angles and plates. The equipment is designed for use by large structural steel fabricators and fits any Beatty toggle beam punch. The tools provide both a quick initial setup and instantaneous shifting of punch and die positions to pick up off-gauge-line holes. This is possible because punch and die units move together as a unit, with movement controlled by a hand crank.

It is pointed out by the manufacturer that with conventional tools the operator must make several passes through the machine, or else change individual die and punch settings in order to punch holes placed off gauge lines. With the new tools the operator can pick up these odd holes and return to the original gauge line setting in a matter of seconds.

E-63—Junior Model Iron Hand

A junior size Iron Hand designed to accommodate the thousands of small and medium sized punch presses being used by manufacturers of pressed metal products, is now in production at the Sahlin Engineering Co., Birmingham, Mich. Used to remove sheet metal stampings from presses automatically, it is recommended for presses with bed widths ranging up to 72 in. and pressure capacities up to 250 tons. It embodies essentially the same design and operating features of the original and larger size Sahlin Iron Hand but is more compact and specially suited to the high speed operation of the smaller presses.

The press operator is required only to place the part in the press, the oftentimes hazardous job of removal being performed automatically by the Iron Hand. By concentrating on the feeding of the press, operators are said often to step up production as the unloader can be set to catch every stroke.



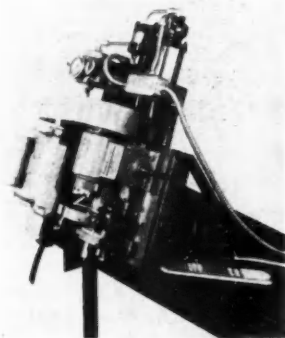
Selling junior size Iron Hand

Entirely self-contained, the Iron Hand is easily transported from one press to another. It can be used to remove blanks or formed articles with equal effectiveness and is adaptable to both open and enclosed type presses. Distances of liftout and swing are adjustable to suit different size stampings.

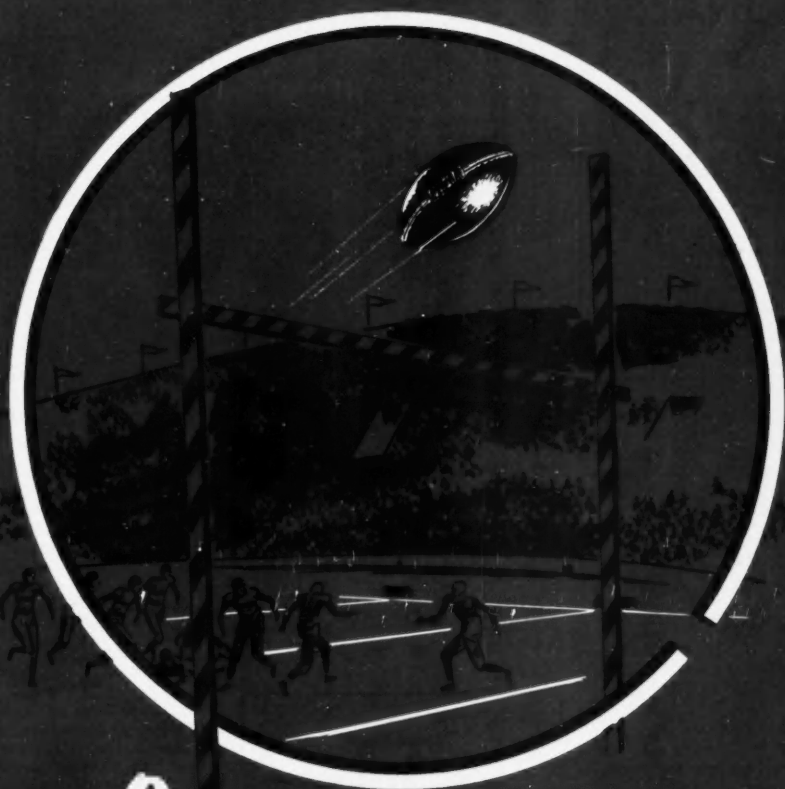
Synchronized with the stroke of the press by electric control, the Iron Hand works automatically, yet can be locked out of position for die tryout or when the press is idle. Made of steel plate the Iron Hand, with its hardened steel jaws, can remove parts weighing 20 lbs or more.

E-64—Tube and Rod-End Finishing Machine

Automatic air operation is now available for simplified high-speed tube deburring and other end finishing operations on the Series 600 tube and rod end finishing machine offered by Pines Engineering Co., Inc., Aurora, Ill. This small bench model machine uses a foot switch operated air cylinder with hydro-check control to leave operators' (Turn to page 56, please)



Pines automatic tube and rod end finishing machine



One more point....

Sealed Power has run up a formidable score with leading automotive manufacturers since 1911. It has been a teamwork achievement. What has been done could not have been done without your cooperation. That teamwork has given Sealed Power the most capable staff, the most complete facilities for engineering and manufacturing piston rings, pistons and cylinder sleeves. The point we want to make now is that these resources are available to help make your good engine even better.



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PERSONALS

Recent Personnel Changes and Appointments at the Plants of the Automotive and Aviation Manufacturers and Their Suppliers.

Lincoln-Mercury Div., Ford Motor Co.—The appointment of **Harold H. Keays** as superintendent of production at the Los Angeles plant has been announced. **Dennis A. Kuhn** as parts and accessories manager, New York Division, has also been announced.

General Motors Corp.—The Board of Directors has announced the election of four vice-presidents, as follows: **Hugh Dean**, who will be in charge of the manufacturing staff, including procurement and schedules, facilities and processes, and real estate. **Carl H. Kindl**, in charge of Canadian and Overseas operations. **Wilbur H. Norton**, in charge of new activity having responsibility for development of policies and procedures in connection with parts merchandising and **Elis S. Hoglund**, assistant general manager, in charge of its manufacturing plants abroad.

General Motors Corp.—The appointment of **James L. Conlon** as general manager of the Ternstedt Div. has been announced.

General Motors Corp., Buick Motor Div.—**Steve Richards** will be in charge of public relations for the division.

General Motors Corp., Pontiac Motor Div.—**Lewlie W. Walker** has been made sales promotion manager for Pontiac.

Chrysler Corp., Dodge Div.—**L. F. Desmond** has been appointed sales supervisor.

Hudson Motor Car Co.—**G. A. J. Hadley** has been appointed domestic sales manager. **A. F. Rust** has been named used car manager.

Willys-Overland Motors, Inc. — **Howard E. Carson** has been appointed manager of the market research and sales analysis dept.

The Autocar Co.—**Harley W. Harris** has been named general service manager at the company's Ardmore plant.

Consolidated Vultee Aircraft Co.—**Emmett McCabe** was elected chairman of the Western Region Public Relations Advisory Council of Aircraft Industries Association. **Al Cline**, of Northrop Aircraft Co., was named vice-chairman.

Lockheed Aircraft Service, Inc.—**J. Kenneth Hull** was elected president of the company.

The Glenn L. Martin Co.—The three new members elected to the Board of Directors are as follows: **Harvey J. Gunderson**, **Chester F. Hockley** and **Daniel A. Evatt**.

The Bullard Co. — **M. K. Peck** has been appointed to supervise and activate the sales of the recently acquired Bullard-Universal Horizontal Boring Machine line.

Aluminum Company of America—**B. J. Fletcher** has been named assistant chief hydraulic engineer for the company.

Thermoid Co.—**Jack Brand** has been made merchandising director, Automotive Rubber Products.

Mack Trucks, Inc.—**Charles F. Dedon** has been appointed manager of the company's Mineola Direct Factory Branch.

Wright Hoist Div., American Chain & Cable Co., Inc.—**S. J. Woodworth** has been appointed sales manager.

Necrology

Robert A. Weinhardt, 67, automotive power plant engineer, Willys-Overland Motors, Inc., died on Sept. 26 in Toledo, O.

Joseph D. Cotton, 75, vice president and director, the Four Wheel Drive Auto Co., died on Sept. 23 in Clintonville, Wis.

Thomas F. Powers, 45, chief auditor, GM's Hyatt Bearing Div., died on Oct. 2 in Cranford, N. J.

Harry Stanfield, 41, superintendent of the tool and die dept., GM's Chevrolet Motor Div. plant in Cleveland, O., died on Oct. 2 in Cleveland.

William T. Dinkins, 60, vice president and a director of the Richfield Oil Corp., died recently in Los Angeles.

George D. Keller, 56, chairman and president, Keller Motor Corp., Huntsville, Ala., formerly vice-president of the Studebaker Corp., died Oct. 5 in New York City.

Worthington Pump and Machinery Corp.—The assignment of **Harry E. Lewis** to the Foreign and Export Dept., has been announced.

Redmond Co., Inc.—**Edward Latta** has joined the engineering staff of the company as a special project engineer. Other new men assigned to the new project engineering section are **George C. Morris**, **John T. Howes** and **F. Richard Merriam**.

Seiberling Rubber Co.—The following appointments were announced as the result of the consolidation of advertising and merchandising departments. **J. A. Fouché** has been named manager, **John H. Fogarty**, assistant manager.

Minnesota Mining & Manufacturing Co.—**William L. McKnight** has been elected to the newly created post of chairman of the board. His successor as president is **Richard P. Carlton**. **Archibald C. Bush** is chairman of the executive committee. Two new executive vice-presidents are **George H. Halpin** and **Herbert P. Buetow**. Mr. Halpin will continue to direct sales activities. Mr. Buetow becomes executive vice-president in charge of finance.

The Cleveland Crane and Engineering Co.—**Milton T. Carleton** has been appointed works manager.

Heli-Coil Corp.—**Louis R. Ripley** has been elected president of the corporation.

Vanadium Corp. of America—**Ward A. Miller**, vice-president and director has been placed in charge of administering and coordinating activities of the selling and technical divisions. **Gustav Laub** was elected vice-president in charge of sales.

Watson-Stillman Co.—The appointment of **Frank G. Helander** as executive vice-president has been announced.

Dunlop Tire and Rubber Goods Co., Ltd.—(Toronto) **J. I. Simpson** has retired as general manager, remaining as president. **D. B. Collett**, formerly general works manager of the company's plant in Liverpool, has been named vice-president and general manager, succeeding Mr. Simpson.

National Screw & Manufacturing Co.—**H. P. Ladds**, president, has been elected to the board of Lock Thread Corp.

Hart Pressed Steel Corp.—**Russell F. Weishuhn** has been made a member of the staff as body and parts designer.

Outboard, Marine and Manufacturing Co.—Retirement of **W. C. Clausen** as a vice-president, has been announced.

A. Y. McDonald Mfg. Co.—Appointment of **A. O. Payne** as chief engineer has been announced.



PERMATEX PIPE JOINT COMPOUND No. 51 is applied with a brush. It spreads evenly over threaded surfaces . . . and stays put!

Does not harden or crack. Remains flexible and resistant to continual vibration. Assemblies can be adjusted easily . . . without breaking seal.

PERMATEX PIPE JOINT COMPOUND No. 51 produces unions that are leak-proof to hot or cold water, salt water, steam, illuminating gas, lubricating oils and greases, fuel oils, gasoline, kerosene, ethylene glycol and many other liquids and gases.

PERMATEX COMPANY, INC.
BROOKLYN 29, N. Y., U. S. A.

Leaders in Chemical Research and Production since 1909

PUBLICATIONS AVAILABLE

Publications listed in this department are obtainable by subscribers through the Editorial Department of AUTOMOTIVE INDUSTRIES. In making requests please be sure to give the NUMBER of the item concerning the publication desired, your name and address, company connection and title.

D-90 Pre-Lubricated Bearings

Westinghouse Electric Corp.—Facts About Pre-Lubricated Bearings is the title of a new booklet. It starts with a discussion of why pre-lubricated bearings are possible and includes sections devoted to "desirable qualities of grease," "tests to prove the adequacy of grease," etc. Several case-history-type examples are also included.

D-91 Drills and Reamers

Charles H. Besly & Co.—A new 48-page catalog on its recently introduced line of high speed twist drills and reamers is available. The catalog presents complete specifications and prices; includes all standard sizes and types of taper and straight shank regular, three-fluted and four-fluted drills as well as hand and machine chucking reamers. Pocket size format is used to provide extra convenience.

D-92 Abrasive Segments

Simonds Abrasive Co.—A 4-page bulletin explains how segments are used, their advantages, discusses abrasives and bonds employed. Included also are grain and grade recommendations of abrasive segments for both surface

grinding and machine knife grinding operations.

D-93 Autofeed Presses

Danly Machine Specialties, Inc.—In addition to complete catalog information and specifications on the entire line of Danly Heavy-Duty Autofeed Presses, a new 16-page booklet contains detailed information on exclusive mechanical features, including the new Danly clutch.

D-94 Selector and Comparison Chart

American Brake Shoe Co.—A new Selector and Comparison Chart of Hardfacing Rods and Electrodes is available. The chart lists each of Amseco's welding rods and electrodes and indicates the type of service for which each is designed. Metallurgical and physical descriptions of each rod are so arranged as to simplify selection by the user of the right rod for the right job.

D-95 Hose Assemblies

Resistoflex Corp.—A 4-page bulletin on Resistoflex synthetic, solvent-proof

products, describes compar-tubed flexible hose assemblies for original equipment. The bulletin also cites typical uses for which Resistoflex hose assemblies are suited—such as hydraulic, refrigerant, lubrication and chemical lines.

D-96 Lighting Equipment

Benjamin Electric Mfg. Co.—A new 40-page Quick-Reference Catalog Bulletin describes and illustrates the Benjamin Lighting Units. Included in the reference bulletin are specifications, list prices and lighting data on the new "Sky-Glo" Luminous Louvered System.

D-97 Oakite CyrsCoat Process

Oakite Products, Inc.—A new folder tells how Oakite CyrsCoat Process effects improved adhesion of paint to metal, prevents corrosion of parts before painting.

D-98 Driving Information Booklet

General Motors Corp.—A revised edition of "We Drivers," an illustrated booklet in everyday language, is now available. The booklet was written to serve as a clearing house for practical driving information sufficiently broad to be useful to owners of all makes of cars. Safety suggestions are included. Typical chapters are Curves and Turns; Night Driving; Our Brakes; Driving on Hills, etc. A newly added chapter is devoted to the operation of cars with automatic transmissions.

(Turn to page 100, please)

TIME SAVER COUPON for your convenience in obtaining, **WITHOUT OBLIGATION**, more information on any one or more of the publications described above **OR New Production and Plant Equipment OR New Products** items described on other pages.

**Readers' Service Department,
Automotive Industries,
Chestnut & 56th Sts., Philadelphia 39, Pa.**

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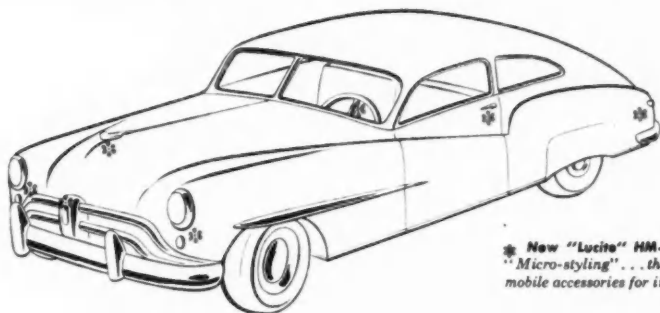
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IMPROVED ACRYLIC RESIN FOR ACCESSORY STYLING!

DU PONT LUCITE HM-140

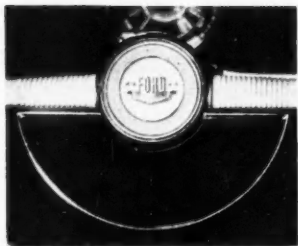
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HAS BETTER MOLDING PROPERTIES... BETTER COLOR

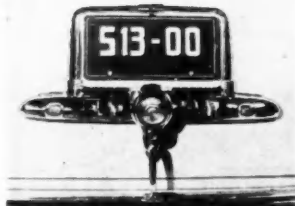


* New "Lucite" HM-140 fits right into your plans for "Micro-styling"... the design of small but important automobile accessories for improved appearance and utility.

Provides added beauty and utility in hood ornaments • horn buttons • lamp lenses • reflectors • medallions • dials



A handsome horn button of sparkling "Lucite" in beautiful three-dimensional colors. Looks smooth... is pleasant to the touch... on 15 makes of cars using horn buttons of "Lucite." (Horn button molded by Erie Resistor Corp., Erie, Penna.)



Reflectors and lenses of "Lucite" are weather-resistant, non-fading. Reflectors are molded with such accuracy that they reflect beams of headlamps more than a quarter-mile away. (Reflectors for six makes of cars molded by Stinsonite Plastics, Chicago.)

New "Lucite" HM-140 molding powder offers improved features for the automotive industry. It has better molding characteristics and is even more water-white than well-known "Lucite" HM-122.

Since the introduction of "Lucite" in 1937, Du Pont has continued to develop improved acrylic resin compositions for the automotive industry. Today, 19 makes of cars are using 138 parts molded of "Lucite." Here are some of its outstanding advantages:



UNUSUAL VERSATILITY

"Lucite" can be readily molded into an almost unlimited variety of designs. It can be molded and painted to obtain beautiful three-dimensional color effects.



LONG-LASTING COLOR

"Lucite" comes in a wide range of brilliant, colorfast hues. Transparent, translucent, or opaque, it holds its beauty through years of weathering and hard service.



SPARKLING TRANSPARENCY

The light-transmission of "Lucite" is as high as that of finest optical glass. Its remarkable ability to "edge-light" and "pipe" light around corners makes it adaptable for many special effects.



TIME-TESTED DURABILITY

On the assembly line or after years of service under the most rugged conditions, parts made of "Lucite" still retain full beauty and utility. The weather-resistance of "Lucite" is unsurpassed by any transparent plastic. It is light in weight and virtually unbreakable. In normal use, it isn't damaged by gasoline or lubricants, or by many common solvents.

WRITE FOR FURTHER INFORMATION—on

"Lucite" HM-140 and other DuPont plastics. If you wish, Du Pont technical men will be glad to consult with you in confidence and advise on applications of Du Pont plastics to fit your needs. Write to Plastics Dept., E. I. du Pont de Nemours & Co. (Inc.), at the most convenient address: General Motors Bldg., Detroit, Mich.; 350 Fifth Avenue, New York 1, New York; 78. Dearborn St., Chicago 3, Ill.



(Continued from page 50)

hands free to handle work up to 2 in. dia at production speeds of 800 to 1200 tube ends per hr.

A vertical mounting base is available for gravity unloading of short workpieces so that all the operator need do is to load the chuck. Tooling can be furnished for center drilling, rod chamfering, drilling, reaming, pointing and boring, in addition to tube deburring.

The end of the tube or rod is placed between the chuck jaws and against the stop which locates the work while the operator depresses the electric foot switch which actuates the air cylinder. The piston stroke through a rack and cam closes the chuck, removes the stop and feeds the work to the rotating tool. The hydro-check can be adjusted to control any portion of the cylinder stroke to permit a selection of feed speeds. A micro-switch is adjustable to reverse the cylinder stroke and open the chuck at any point during the stroke. Accurate depth-of-cut is maintained by an adjustable positive stop. A 3-second cycle is common.

Interchangeable 2-step V-belt sheaves are used to permit selection of 8 possible spindle speeds. Removal of a single thumb screw drops the belt guard for belt and sheave changes. A spindle speed chart riveted to the belt guard offers a quick selection of proper sheave combinations.

Replaceable chuck jaw inserts are thumb screwed into the master jaws. The tool holder, slotted to take 3 adjustable tools, threads over a tapered seat on the machine spindle.

F-78—Distributor and Governor Combination

A Centri-Vac sandwich truck governor has recently been introduced by Holley Carburetor Co., Detroit, Mich., and offered in combination with the Delco-Remy distributor. The new Holley Centri-Vac governor is available either as a sandwich governor, or as an integral part of the carburetor in original equipment installations.

Claimed for this new type governor is availability of full power when heavy loads are handled on hills, since the



For additional information regarding any of these items, please use coupon on page 54

governor throttle remains wide open until the engine reaches its governed speed. As the Centri-Vac governor is operated by a vacuum powered diaphragm controlled by a centrifugal air valve mounted on the side of the distributor, greater responsiveness to the throttle is afforded also, without engine surging.

Quick installation, without need for special linkage or adapter accessories, is a further built-in advantage claimed for the governor design. Only one piece of metal tubing is required in connecting the governor control valve with the governor.

F-79—Welder with Plate-Type Rectifiers

New d-c welding machines, using plate-type rectifiers instead of the conventional rotating components used in motor-generator welding equipment, are available from Westinghouse Electric Corp., Pittsburgh, Pa. The welders are rated in accordance with NEMA standards for industrial type, single-operator, arc welders. They are available in 200-, 300-, and 400-amp ratings.

Major components of the new rectifier-type d-c welders are three-phase welding transformer; three-phase adjustable reactor; and a plate-type (selenium) three-phase, full-wave rectifier.

The no-load loss in a 300-amp welder is 500 watts, as compared to 2480 to 3600 watts for a conventional motor-

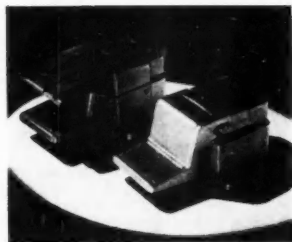


Westinghouse D-C welder using plate-type rectifiers

generator welder. The power factor at normal operating load conditions is comparable to induction-motor-driven welders. The welder's efficiency at full load is 96 per cent, as compared to 54 per cent for motor-generator welders. Efficiency increases at reduced load conditions, reaching 73 per cent at 20 per cent rated load.

F-80—Air Cylinder Control Valve

A minimum effort foot-operated air cylinder control valve of a reciprocating, packless, disc type and known as

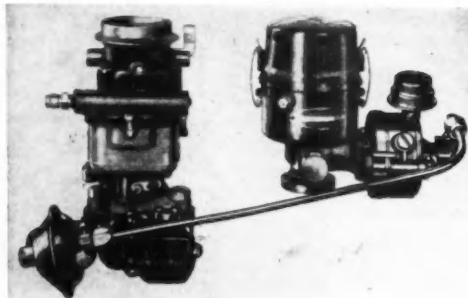


Hannifin model NFS foot operated air control valve shown with and without pedal guard

Model NFS, is latest addition to the "Directaire" series of air control valves put out by Hannifin Corp., Chicago, Ill.

Piston operated and pilot controlled, the valve is designed to direct compressed air alternately to two pressure ports for the operation of a double-acting air cylinder. The sliding, self-lapping main valve disc is shifted by a reciprocating light metal piston, which is moved by alternately admit-

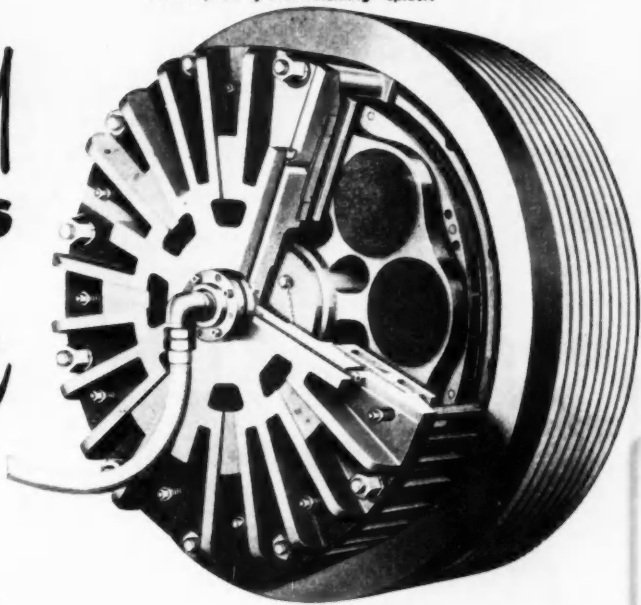
(Turn to page 58, please)



Holley Centre-Vac sandwich truck governor offered in combination with the Delco-Remy distributor

Here's why **DANLY PRESSES** run longer

This cutaway view of the new, cool-running Danly Clutch shows how the friction discs are held in place by their retaining "spider."



THE NEW COOL-RUNNING DANLY CLUTCH OUTWEARS CONVENTIONAL CLUTCHES 7 TO 1!

...and greatly reduces the largest single item of press operating costs, clutch maintenance. The cool-running Danly clutch overcomes heat...major cause of clutch wear...by reducing clutch "pick up" load 80%. High velocity air cooling of all internal parts produces a still further reduction in operating temperature so that a Danly Clutch in continuous operation runs only 35° above room temperature. Actual tests under normal operating conditions resulted in only .006" of friction surface wear for 100,000 engagements in a Danly clutch against .043" of wear in a conventional type clutch.

And complete renewal of friction material takes less than 30 minutes! Only quick replacement of special friction discs in an easily accessible spider is required. No riveting, fitting or extensive disassembly is necessary.

Other outstanding features include positive pressure lubrication throughout, completely stress relieved frame weldments, and sensitive control reaction. All of these outstanding Danly Press advantages are certain to reduce overall operating costs, through labor savings and longer die life.

**IT COSTS LESS
TO RUN A
DANLY PRESS!**



Send for this free booklet on the new Danly AUTOFEED Presses today and see how these outstanding features save money on high production stamping runs.

DANLY MACHINE SPECIALTIES, INC.
2100 SOUTH 52ND AVENUE, CHICAGO 50, ILLINOIS

DANLY MECHANICAL PRESSES...30 TO 3000 TONS



NEW PRODUCTS

For additional information regarding any of these items, please use coupon on page 54

(Continued from page 56)

ting line pressure to one end and venting the other.

Although constructed to withstand the full weight of any operator, these valves respond to "tip-toe" touch. The

foot pedal actually operates only a small pilot valve and moves less than $\frac{1}{4}$ in. under very slight foot pressure for quick, easy action. Air pressure replaces muscular effort in the shifting of the main valve disc. Safety guards, which extend over the pedals and minimize the possibility of unintentional operation, are optional.

Constructed to operate with air pressure from 25 to 150 lbs per sq in., the new "Directaire" model is being manufactured in $\frac{1}{2}$ and $\frac{3}{4}$ in. sizes.

F-81—Arctic Rubber

Discovery of a synthetic rubber poly-

mer that will bounce instead of shatter at 75 below zero F is announced by the Firestone Tire and Rubber Co., Akron, Ohio.

Resiliency of this new Arctic rubber may enable engineers to solve innumerable problems in the operation of machinery, motor vehicles and aircraft at sub-zero Arctic temperature, it is stated.

Rubber tires, hose, gaskets and belting in the past have frozen as hard as rock at temperatures below minus 60 F.

In comparisons with GR-S and natural rubber, the new Arctic polymer is said to have shown two advantages in tires, tested under extreme sub-zero laboratory conditions. Tires do not stiffen so much that they develop permanent flat spots when parked, and treads do not harden and chip out.

Is your gas tank showing?

.... if it is, make it a DONALDSON

Streamlined **MONO-SEAM** Tank!



If your power unit has a gravity feed, the gas tank must be mounted high, making it the most conspicuous part of the engine. That's why it's important from the sales angle, to use a gas tank that gives a streamlined, modern appearance to your engine.

Donaldson Mono-Seam gas tanks are produced from extra-deep-drawing quality terne plate, making them impervious to rust. Each tank is pressure-tested against leaks at 15# P.S.I.

Greater Sales Appeal . . . at less cost!

Donaldson Mono-Seam tanks cost you no more, and in many cases less than regular tanks with triple seams. Tanks are available in sizes from $\frac{1}{2}$ to 6-gallon capacity. Many models in round, elliptical and square shapes currently being produced in volume. Custom-built tanks to fit special needs can often be produced from existing tools and dies. Mounting brackets simplify installation.

Write for catalog or engineering assistance

DONALDSON COMPANY Inc.

666 Pelham Blvd. • St. Paul 4, Minnesota
Donaldson Co. (Canada) Ltd., Chatham, Ontario

DONALDSON

STREAMLINED FOR SELLING!

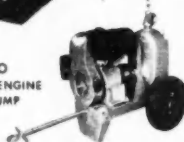
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AND PUMP



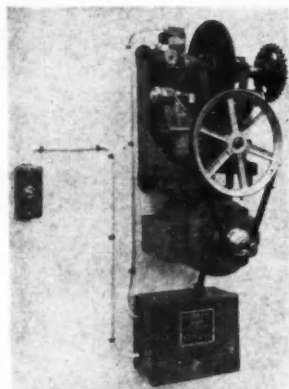
ONAN
PORTABLE ELECTRIC
PLANT



F-82—Line of Buffer Solutions

A new line of buffer solutions for calibrating any pH instrument is announced by Leeds & Northrup Co., Phila., Pa. Nominal pH values are 4, 7, and 9; actual, 4.01, 6.86, and 9.16 at 25 C. Solutions are supplied in 1 pt. unbreakable, non-contaminating, reusable polyethylene bottles on which are printed pH-temperature calibrations from 0 to 60 C. Buffers are made, and checked after bottling, to National Bureau of Standards specifications.

F-83—Robot Commercial Door Operator



New Model SM (side mount) robot commercial door operator placed on the market by Robot Appliances, Inc., Dearborn, Mich., and featuring positive limit switches to eliminate coasting, motor detachable from the operator, and automatic electrical controls. The operator is available in three sizes having sufficient adjustment to provide a 50 second cycle in either direction in order to give 50 ft of door travel at 1 ft per second. The door can be stopped and reversed from any position either in opening or closing without completing the cycle.

(Turn to page 60, please)



WHERE THE STEERING IS *Tough*

... ROSS gives Ease and Economy

Ross
Cam & Lever **STEERING**

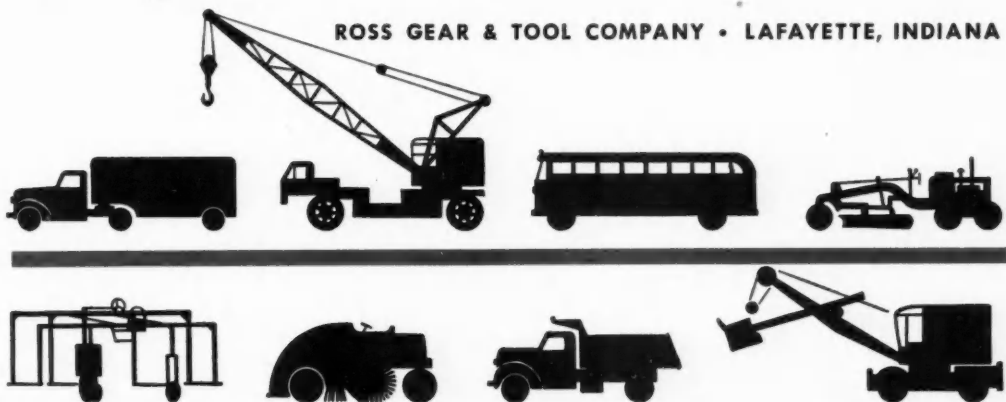
Ever realize that *exacting* steering requirements exist on *other* vehicles besides passenger cars, trucks and buses?

These other special vehicles range from corn detasseling machines (illustrated at bottom, left) to the industrial tractor for storing the finished product of farm and factory.

Among the many specialized machines for modern living are those for agriculture such as farm tractors and combines . . . for earth moving, road grading and construction projects . . . street sweepers to maintain sanitary conditions in our cities, and boats to add to the pleasure of our vacations.

Whatever your steering problem may be, Ross is prepared to help.

ROSS GEAR & TOOL COMPANY • LAFAYETTE, INDIANA



NEW PRODUCTS

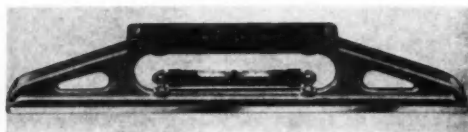
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(Continued from page 58)

F-84—Aligning Level For Machines

Acquired by the Bullard Co. of Bridgeport, Conn., from the Universal

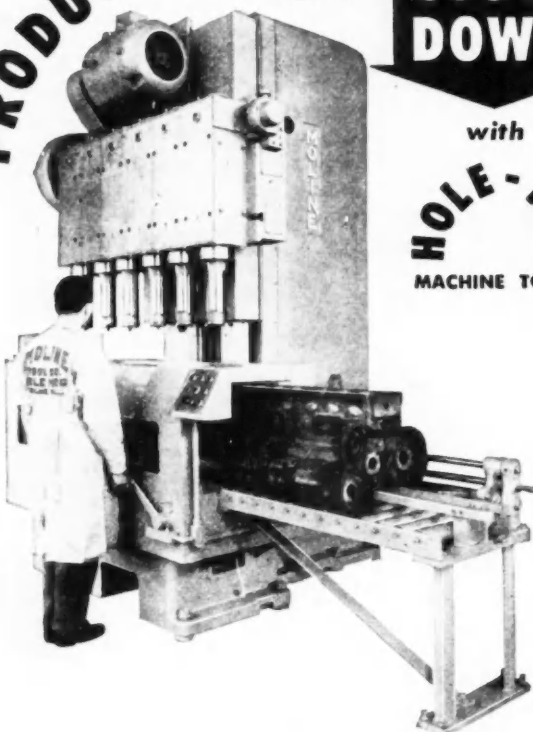
Bullard-Universal precision aligning level



Boring Machine Co. of Hudson, Mass., is the Universal precision aligning level for leveling all types of machines. Furnished in two sizes—18 in. and 27 in., it is provided with vial mounted on two brass studs for high accuracy adjustment. Bubble in the vial has a sensitive-

ness of 5 seconds of arc per graduation, which is equivalent to showing per graduation on the vial a variation of 0.0003 of an in. per ft. The level casting is thoroughly insulated from the palm of the hand by means of a handle of non-conductive material.

PRODUCTION UP



COSTS DOWN

with

HOLE-HOG

MACHINE TOOLS

- Multi-Spindle Boring
- Single and Multi-Spindle Honing
- Straight Line Multi-Drilling
- Adjustable Spindle Drilling

- Vertical and Way-Type Fixed Center Drilling, Boring and Tapping
- Special Multiple Operation Machine Tools

"Hole-Hog" does it better with 50 years of Machine Tool Engineering experience at your service

MOLINE TOOL CO.
100 20th Street
MOLINE, ILLINOIS



F-85—Diamond Wheel Truing Device

Expected to overcome a problem that has long confronted diamond wheel users, a device for truing diamond abrasive wheels known as the Norton brake-controlled truing device, has been released for sale by the Norton Co., Worcester, Mass.

The new device is designed for truing diamond wheels of all bond types with the exception of resinoid bonded diamond wheels finer than 220 grit. These wheels are readily trued with a square or rectangular-shaped Crystolon vitrified bonded abrasive stick held in a vise and passed across the face of the diamond wheel.

The device, small, compact, sturdy, and simple to set up and operate, is a self-contained unit, driven by the diamond wheel to be trued, rather than by a separate motor, in order to eliminate extra "nuisance" wires and motor upkeep. This obviates need for reducing speed of the diamond wheel during the truing cycle.

Rapidity with which the new device trues diamond wheels is a feature. An 18 in. metal bonded diamond cut-off wheel, such as used in the stone industry—found to be 0.015 in. out-of-round—is said to have been made to run true in one and one-half minutes. Equally notable results are claimed obtained on vitrified bonded diamond wheels used for carbide grinding.

F-86—Storage Battery

An automobile storage battery known as the U. S. Super Powerlife battery announced by United States Rubber Co., N. Y., N. Y., is said to provide longer life and quicker starting, more electrical power for accessories, and to have three times the liquid capacity of ordinary batteries. This additional liquid reserve besides permitting the battery to better withstand engine heat also eliminates need for frequent re-fills, water being required only once a season or less in normal use.

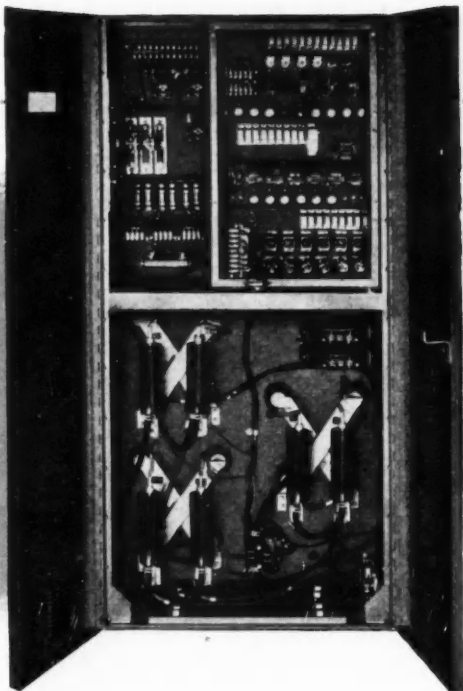
(Turn to page 64, please)

YOU CAN BE **SURE**.. IF IT'S
Westinghouse

For your Resistance
Welding Applications



NOW...



a 3-PHASE CONTROL **cuts kva demand in half**

Here's a new, cost-cutting answer to resistance welding problems caused by power use restrictions, excessive power costs or poor weld quality. It's the Westinghouse 3-phase, low-frequency welding control that cuts kva demand in half, while providing good welds on all types of metals.

Rusty or scaly steels, aluminum, brass and steel alloys join easily and the job goes smoothly because there's less tip pickup... less spitting at the electrodes. This is because the control, which is designed to spread kva over the three phases, distributes the load and provides for a smooth flow of heat into the metal. Kva demand is less because of the reduction of secondary reactance that accompanies operation at lower frequencies.

This is a complete packaged unit that controls all mechanical and electrical functions for the welding machine. It can be mounted on the floor or on the side

of the machine. A swing-out panel provides easy access to all components and circuits. It can be applied to existing installations by changing the welding machine transformer.

For complete details, see your Westinghouse representative, or your local resistance welding machinery agent. Ask for B-4341. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh, Pa.

J-40718


Westinghouse

**ELECTRONIC
CONTROL**





season's best ground-gainer

 Earth-moving equipment . . . working under heavy loads and in constant dirt and dust . . . makes a tough proving ground for brake linings and clutch facings.

It's worth noting that leading manufacturers in this field use R/M friction materials on many models, from road graders to giant bulldozers.

In industry after industry, R/M gets the call for original equipment because (1) R/M materials are right for the job, and (2) R/M service is so helpful in solving problems in design and supply of brake linings and clutch facings.

Behind the R/M representative who calls on you stand four great plants, four complete research staffs, four testing laboratories . . . all the facilities of the largest producer of friction materials. Your R/M representative will be glad to point out what this team can do for you.

RAYBESTOS-MANHATTAN, INC.

EQUIPMENT SALES DIVISION

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445 Lake Shore Drive, Chicago 11, Ill.

4651 Pacific Blvd., Los Angeles 11, Calif.

1071 Union Commerce Bldg., Cleveland 14, Ohio

Factories: Bridgeport, Conn. Manheim, Pa. Passaic, N. J. No. Charleston, S. C.



RAYBESTOS-MANHATTAN, INC., Manufacturers of Brake Linings • Brake Blocks • Clutch Facings
Fan Belts • Radiator Hose • Mechanical Rubber Products • Rubber Covered Equipment • Packings
Asbestos Textiles • Powdered Metal Products • Abrasive and Diamond Wheels • Bowling Balls



FIRST IN FRICTION



Photos Courtesy of
General Electric Co. and
Boeing Airplane Co.

Forgings from **KROPP**



The toughness of Kropp forgings helps make possible the terrific thrust of the J-47 Turbojet engine—power plant of America's great new jet fighters and bombers—including the B-47 "Stratojet," *The World's Fastest Bomber*.

In all modern machines that fly, float or run... vital parts subject to stress are forgings. Thousands of these forgings carry the Kropp trade mark... because America's leading machine designers know and value Kropp's dependable quality. Our facilities are at your service, too. We invite your quotation on drop, hammer or upset "forgings to your specifications."

KROPP FORGE COMPANY
5301 W. Roosevelt Rd., Chicago 50, Ill.



Are you receiving "FORGINGS", . . . the KROPP publication for industry? If you want to keep current on forging facts, send us your name and address and ask for "FORGINGS".

NEW PRODUCTS

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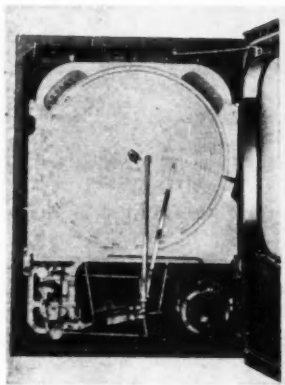
(Continued from page 60)

Fiberglas mats are used in the battery's construction to help preserve the power-producing plates. All-rubber separators are used for better insulation and to help provide extra power for quicker starting.

The battery will be produced for all makes of automobiles and for trucks using passenger-car size batteries.

F-87—Air-Operated Control Instruments

Known as the Series 500 controllers, a new line of air-operated control instruments has been announced by the Bristol Co., Waterbury, Conn. Included are controllers for automatically controlling temperature, pressure, flow,



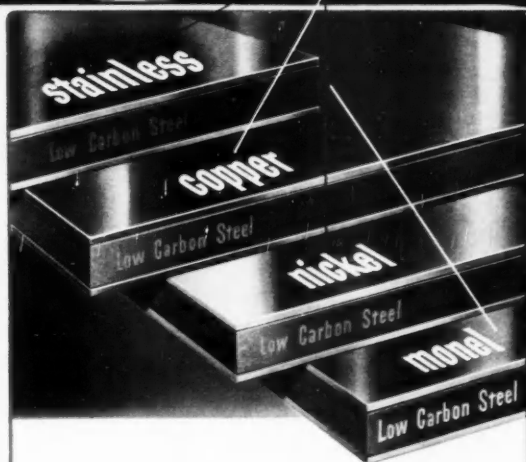
Bristol Series 500 controllers

liquid level, humidity, and pH value. The new controllers have calibrated control actions. Reset rate, derivative time, and proportional band adjustments are accurately calibrated and reproducible. They have only one service adjustment. Controllers can be completely disassembled and after being reassembled, with replacement parts, only one adjustment is required to put the system in exact calibration. All Series 500 reset controllers are equipped with reset action stops.

The new instruments are offered in five types of control action: on-off, proportional, reset, derivative, and reset plus derivative. The instruments are readily convertible from one type to another.



solid



SuVeneer®
CLAD METALS

Give you high-performance surfaces with economy inside . . . for a world of profitable product fabrication!

You get the *solid* metal surface of your choice when you specify SuVENEER CLAD METAL . . . dense, non-porous, non-peeling, impermeable . . . bonded inseparably to a core of low carbon strip steel. You enjoy economy of purchase, while assuring performance values for your products inherent in the cladding metal you select. • Quality-produced SuVeneer Clad Metals are available in easy-handling coils, precise in every specification. *Write us on your requirements.*



Superior Steel
CORPORATION

CARNEGIE, PENNSYLVANIA

DISCOVER THE SAVINGS IN Aetna's PATENTED* T-TYPE DESIGN

* Exclusive design protected by U. S. patent Nos. 1958725 and 2140818.



- 1 Patented T-shaped, oil-filled bronze ball separator maintains fixed alignment, ends the wear and "chatter" of eccentric thrust, provides the plus smoothness and durability of bronze-to-steel contact.
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Indeed, the Aetna Clutch Release Bearing is a good example of those dependable *little* things from which automotive vehicles get their dependability-*bigness*.

Aetna Ball and Roller Bearing Company, 4600 Shubert Avenue, Chicago 39, Illinois. In Detroit: Sam T. Keller, 2457 Woodward Avenue.

Aetna

T-TYPE Clutch Release



BEARINGS

WITH THE . . . THAT TAMES TROUBLE

Greater Equipment Buying

(Continued from page 28)

But that's only part of the story. Consider Borg-Warner. The company has announced a unique type of torque converter transmission which will be found on Studebaker cars early in 1950. Borg-Warner needs production facilities for this unit and that will mean a major buying program involving special and standard equipment.

At the present writing the Hydramatic transmission pioneered by Oldsmobile has had the longest period of use—some ten years—and by far the largest cumulative production—over one-million units. Today it is available on Oldsmobile, Cadillac, Pontiac, Lincoln, and the Nash Ambassador. Production currently is concentrated in the expanded plant of the Detroit Transmission Div., GMC. If some of the present users of this device elect to adopt some new design—and there are several in the picture—that will mean new facilities elsewhere. And potential business for machine tool builders.

However, the motor car field is not the only one concerned with automatic transmissions. Buses are using them now. And there is potential expansion for the Allison Torqmatic transmission recently adopted by Euclid for large off-highway vehicles. Moreover, one major truck builder is grooming an interesting torque converter for light delivery vehicles and some larger models.

The same is true in the engine field; it is not confined to motor car engines. Continental Motors Corp. is completing an extensive new facility for building a line of aircooled heavy duty engines. Reo recently completed the development of transfer machine line facilities for manufacturing its new overhead valve engine, a facility involving the expenditure of millions of dollars for equipment and tooling. Only a year ago Chris-Craft placed in operation its new plant at Grand Rapids for building an outboard motor.

Detroit Diesel is completing the tooling of an entirely new production line for its aluminum Diesel engine—the "110"—which has been adopted for use in trucks and buses and will be groomed for tractors and industrial applications as well. Detroit Diesel also completed recently an entirely new machine department for producing cylinder sleeves, using the Marquenching technique.

Many new programs are in process at this writing; and others will be initiated in the near future. For one example, it is reported that Buick is grooming a new transfer line for cylinder blocks. Buick has a constant program of equipment installation in keeping with its policy of maintaining all facilities up to date. Its policy is one of constantly looking ahead.

A small item like hydraulic valve lifters which are being adopted

throughout General Motors—currently on Oldsmobile, Cadillac, and Buick—initiated a major expansion program at Diesel Equipment Div., GMC., at Grand Rapids and may well call for further expansion. Similar adoption by other motor car manufacturers may create changes at producers of hydraulic valve adjusters.

International Harvester Co. has introduced many new plants and departments in its modernization and expansion program.

There are no prophets of gloom in the automotive industries. Management finds that the march of progress differs radically from the picture given since the war by self-appointed experts who anticipated a depression or recession. Recently we were shown a report indicating that for one make of car almost 20 per cent of dealers the country over did not yet have a new 1949 model in the show room.

General Motor's average employment for April, May, and June this year was 403,743 compared with 375,079 for the second quarter of 1948. GM's highest prewar employment for any previous three months was in the second quarter of 1941 when 318,726 employees were on



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the payroll, part of them engaged in production of defense materiel. In addition, GM is beginning the construction of a Diesel-electric locomotive plant on a 210-acre tract of land at London, Ontario, Canada.

Saturation of the market? Since the end of the war the industry has produced over 13 million cars. But total registration is over 34 million cars. There can be no saturation until the millions of prewar cars have been junked and replaced by postwar models.

What industrialists think about the economic picture in terms of action is exemplified by Clark Equipment Co.,

builders of axles, transmissions, industrial trucks, and railroad equipment. They are completing at this writing an impressive modern factory on the outskirts of Jackson, Mich. It is reported to be the most advanced plant for gear making known to the art and will doubtless entail a capital expenditure around \$5 million to \$6 million.

Nash-Kelvinator spent about \$15 million to launch its new models a year ago. The company has just invested an additional \$3 million for new equipment and tooling changes incident to its 1950 models.

A recent news announcement presented a progress report on advanced

engineering at Kaiser-Frazer, a program leading eventually to the use of large aluminum die castings for doors, door frames, and trunk lids. The work is being done cooperatively with Doehler-Jarvis. It will mean, eventually, the installation of a new door department at Willow Run, together with the acquisition of enormous die casting machines dwarfing equipment now in use.

The fact is that constant improvement of motor vehicles and the parts that go into them means constant change and continuing equipment programs.

But in addition to changes incident to improved design and the appearance of new competitive products, the character of all plants is constantly changing. Equipment and tooling that fails to produce competitively with new machinery is constantly replaced. No major manufacturer in this business can afford to hold on to machinery or continue to employ any process that does not meet the demands of lower cost and higher productivity. Obsolescence rather than service life is a basic rule of the game.

Because of this pressure of competition and changing economic conditions and the appearance of improved machinery and methods, manufacturers are constantly replacing machinery, piece by piece. It is sometimes a subtle process because the size of an automobile plant dwarfs single machine replacements. But over a period of time it changes the complexion of the plant.

The samples of current installations of new equipment illustrated herewith are only a few of the many equally interesting ones to be found throughout the industries. These examples could be multiplied many times.

Devaluation

(Continued from page 25)

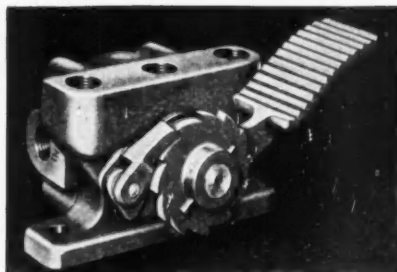
automobile comparable with U. S. luxury convertibles, has been cut \$755, from \$3750 to \$2995. Other Vanguard models have been cut a straight \$350. These include the sedan, reduced from \$2195 to \$1845, and the station wagon, cut from \$2495 to \$2145. The new prices are in effect immediately.

Morris automobiles have been reduced in price by \$220 to \$300, it was announced by James L. Cooke, importers. The four-door Oxford sedan has been reduced from \$2095 to \$1795; the Minor coach has been reduced from \$1595 to \$1375, and the Minor convertible from \$1650 to \$1430.

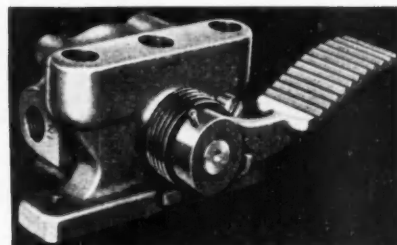
ASTE to Hold Cost Cutting Show in Philadelphia

The American Society of Tool Engineers will hold a giant industrial exposition in Philadelphia, April 10-14, devoted exclusively to the display and demonstration of the latest cost cutting equipment and methods.

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NOPAK Model "R" Foot Valve

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Britain's Aircraft Show

(Continued from page 39)

the "secret list" which meant that spectators were only allowed to watch their impressive maneuvers, no information being given out regarding their speed or characteristics. The following jet fighter machines took the air:

Hawker P. 1052, a high-speed experimental fighter, developed from the P. 1040, with sweptback wings, powered by a Rolls Royce Nene jet engine. This machine showed a speed of 618.27 mph in a flight from London to Paris this year.

Gloster Meteor Mark 4, single seater fighter with two Rolls Royce Derwent turbojet engines and after burning jet tube. Meteor Mark 7 with two Rolls Royce Derwent turbojets. Meteor Mark 8 single seater fighter with two Rolls Royce Derwent turbojets.

Vickers Armstrong P. 510, a swept-back wing experimental fighter with one Rolls Royce Nene, said to be capable of better than 700 mph. Vickers Armstrong Attacker, with a Rolls Royce Nene turbojet, the speed of

which was officially given as 590 mph.

De Havilland Vampire with single Goblin engine and after turning tube. In addition De Havilland had two machines still on the secret list. One of these, the Venom, was released on the opening day. It is a mid-wing double fuselage monoplane with a Ghost engine, and was described as a fighter-bomber. De Havilland has developed the Ghost Vampire night flyer with two staggered seats and radar equipment. The latest Vampires have been converted to take the 5000 lb static thrust Ghost engine.

The Avro 707 was released at the last moment. This is an experimental fighter built by A. V. Roe & Co., with triangular shaped mid wings, powered by a Rolls Royce Derwent turbojet.

Rockets were used on the Fairey 5, built by the Fairey Aviation Co., and powered by a 74 Griffon of 2020 hp. Much attention was paid to after-burning as sponsored by both Rolls Royce and De Havilland. Rolls Royce entered two Gloster Meteors powered by two Derwent V engines incorporating the after-burning system in the jet pipes. As the additional fuel consumption is heavy, after-burning is intended to be used only for short periods at takeoff and combat powers. During after-burning, a larger diameter propelling nozzle is required, and to avoid compromising the engine performance the propelling nozzle must be capable of readjustment to standard size. De Havilland claims that thrust gains of 25 per cent can be obtained for takeoff at sea level with temperatures that can be handled.

De Havilland introduced the Goblin Mark 4 jet engine with a static thrust at sea level of 3500 lb at 10,750 rpm and 3850 lb at speeds of 700 mph. While following the general layout of its predecessors, the Goblin Mark 4 shows the substitution of Nimoric 80A turbine blades for Nimoric 80 used in earlier designs, and in new pattern flame tubes designed to eliminate local hot spots through careful control of combustion and cooling air flow. A trend towards simplification is the substitution of a single-unit fuel pump for the dual pump hitherto standard. In addition there are improvements in the air cooling of the turbine disk. De Havilland has also introduced a civil-rated Goblin, the "35," for the medium class of jet transport. These two engines represent a 30 per cent increase in power over the prototype introduced in 1945.

Armstrong-Siddeley showed the Python turbine propeller on the Lancaster test beds and on the Westland Wyvern T.F. experimental naval test fighter. Under the type test which should shortly be completed, the Python should develop 3560 shp plus 1100 lb static thrust takeoff power at sea level; 3200 shp and 1000 lb thrust climbing power; 3750 shp plus 900 lb thrust cruising output. The firm's double Mamba was

(Turn to page 72, please)

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See Bruning Office Copying Systems Exhibit in spaces 12 and 14 at the National Business Show, Grand Central Palace, New York City, Oct. 24 through 29.

exhibited but not shown in flight.

Impressive flights were made by the Cierva "Air Horse," claimed to be the world's largest and heaviest helicopter, which made its first appearance at Farnborough a year ago. Powered by a Rolls Royce Merlin 24, with a single-stage, single-speed supercharger unit and developing 1645 bhp for takeoff at 3000 rpm, the Cierva has three rotors enabling the aircraft to fly at an all-up weight of 18,000 lb. The firm's Skeeter, with a Gipsy Major engine and a 32 ft main rotor, followed the maneuvers of the big machine. A Westland Sikorsky S 51 was on view, as well as a special machine of this make for crop spraying.

De Havilland exhibited the Sprite assisted takeoff unit giving 5000 lb thrust for approximately 12 seconds, which could be installed in the "Comet" jet liner if found necessary for operations from high altitude tropical airfields. The unit comprises a 39 gal tank for hydrogen peroxide connected to a chamber of strong construction into which the catalyst is fed and in which the chemical reaction takes place. The resulting high-velocity jet is ejected through a nozzle convergent at first but diverging in the last part of its length. Nine bottles built around the reaction chamber carry compressed air at 3000 psi. The Sprite is designed to be mounted internally in wing, nacelle or fuselage or externally in a streamlined cowl. Its weight, charged for use, is 925 lb.

A 20-ft long faster-than-sound rocket was displayed on the Ministry of Supply stand. This rocket burns liquid oxygen and alcohol, develops a thrust equal to 2800 hp, and is launched from a ramp by another "booster" rocket.

The Ministry showed plastic roller bearings which while having lower load-carrying capacity than steel bearings of equivalent size, have been found advantageous for flying controls, radar equipment and photographic apparatus. They are anti-corrosive, non-magnetic, light in weight, low in friction and suitable for operation in almost all fluids. As an example of weight saving, a bearing of 1 in. outside diameter and 0.25 in. inside diameter, weighs 0.12 oz in plastic and 0.35 oz in steel.

Gasoline From Coal to Cost 3 to 4¢ a Gallon More

Unlimited quantities of premium motor gasoline could be produced from coal at a cost that would increase the current service station price to the consumer by only three to four cents a gallon, according to a recent report of the Bureau of Mines. The report, an exhaustive study of estimated plant operating costs for coal hydrogenation presents two sets of calculations for plant construction which would result in production of synthetic fuels at the above prices.

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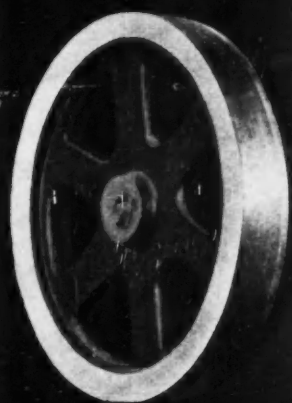
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Dodge B Series Truck Line

(Continued from page 45)

the J, JA, JM, JMA, KA and KMA models. It is available as extra equipment on G, GA, GM, GMA, H, HA, HM, HMA, HH, HHA, HHM and HHMA models. It is unusual that the five-speed transmission is offered on a 1½-ton truck. A new five-speed synchro-shift overdrive transmission is available as extra equipment on J, JA, JM, JMA, KA and KMA models.

The five-speed, constant-mesh trans-

mission continues as standard equipment on the R, RA, T, TA, V and VA models. The overdrive transmission is available for these models as extra equipment.

It is of interest that both the G and H models have special heavy frame design which does not require the usual reinforcements. Cast spoke wheels are standard equipment on the R, T and V groups, replacing the ventilated disk

type used formerly. This is said to reduce unsprung weight and is considered effective in improving brake cooling.

The extensive line of C-O-E models is continued, one of its basic features being the accessibility for checking oil level, adding cooling water, and battery checking simply by raising the hood.

In the two-ton series maximum GVW has been increased to 16,000 lb on the conventional and 16,250 on the C-O-E model. The J-models, formerly rated two-ton, now have a rating of 2½-ton with maximum GVW boosted to 17,000 lb for conventional jobs and 17,250 for C-O-E. The KA has been boosted to a GVW of 17,500 lb and the KMA to 17,750 lb.

R and RA models—formerly rated 2½-ton—now have a nominal rating of 2¾ ton with GVW boosted to 19,000 lb. This increase in rating follows the introduction of the new 122-hp (max gross rating) engine on these models, replacing the former 115-hp engine.

One of the major improvements is found in the electrical system. Standard equipment across the board is a new 40-amp shunt-wound, aircooled generator, replacing the former 35-amp equipment. Too, Dodge offers as extra equipment a choice of 45-amp and 50-amp generators. In addition, the operator can specify a generator having high charging rate at low engine speeds to meet special operating conditions. The ignition system is dust- and splash-proof through use of a moisture-proof distributor, and rubber caps on distributor wires. Resistor type spark plugs with built-in 10,000-ohm resistors, used in conjunction with a high-output coil, help to maintain smooth engine idle, increase electrode life, and aid in reducing radio and television interference. At the same time the coil is mounted on the engine to further reduce interference by reducing the length of the high tension lines. The current-and-voltage regulator also is effectively sealed against dust in the interest of trouble free service.

Dual purpose models are fitted with two-speed axles as standard equipment. Single-speed, double-reduction axles are offered as optional equipment on T, and V models.

Hydraulic brakes are standard equipment on all models, with vacuum booster as extra equipment on F, FA, G, GA, GM and GMA. Vacuum booster is standard on H-models, J-models and R-models, the dual-diaphragm type being standard on the T-models and V-models. In addition, factory-installed air brakes are available as extra equipment on the heavier models—R, T and V.

Airplane type shock absorbers, standard on B, C and front of D models are offered as extra equipment on all the other models.

Cross steering is standard construction on all conventional models, with drag link parallel with the front axle and tie-rod extending from one side to (Turn to page 78, please)



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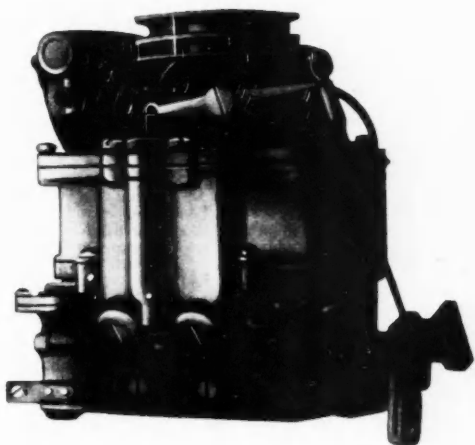
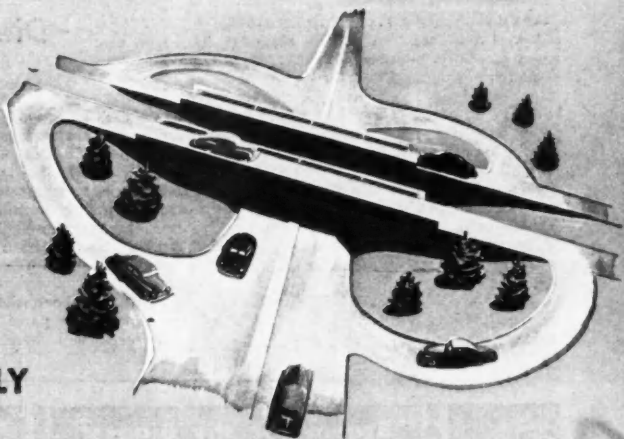
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the other nearly parallel with the front axle. On R and RA models steering gear is of worm-and-sector type. Cam and twin-lever type steering is used on the heavier T, TA, V and VA models; and is standard also on the 229-in. wheelbase R and RA models.

The foregoing is intended only as a sampling of many new features offered by Dodge. Other details of mechanical construction, including the comfort and convenience features of cabs, Air-O-Ride seats, etc., are familiar to our readers and are continued in the new models.

Major specifications of the engines offered in the new line are given in the table.

knows their objective and expects eventually to develop a job that meets requirements. In this case the die-cast frame will be so designed as to make a simple assembly with the body structure, leaving normal variations between the frame and body opening but providing a precision opening for the door and for hinge and lock mountings.

As mentioned above, the final design of the inner door panel for production purposes will depend upon the

nature of future body design. Current experimental work is intended to point the way to future design but even at this time K-F has no fears as to the ability of the die-cast part to withstand service abuse. Contrary to some off-hand impressions the composite door is sturdy and capable of absorbing the effects of impact.

It may be noted that the outer door panel remains a steel stamping as before and this panel is crimped over the edge of the die casting in simple fashion.

The experimental inner panel is said to be one of the largest one-piece aluminum die castings produced in the industry. It measures 43½ by 33 in. and weighs 13½ lb before trimming. With respect to a complete door assembly, the composite unit represents a weight saving of 8.6 lb per door or 34.4 lb total weight reduction for a four-door sedan.

Actual dollars-and-cents production economies to be effected with the use of aluminum die castings are difficult to assess because of numerous potential intangible economies. The latest estimate is that with present labor rates and cost of aluminum, the cost is about the same as for conventional doors. This takes into account relative die costs. Actually, even the conservative estimate is expected to be something in favor of the die cast construction if the intangibles—such as reduction in labor on the body-in-white line and speeding up of production—are considered.

On the other hand, a break-even cost estimate certainly does not justify the scrapping of sheet metal dies and the making of new die-casting dies for the current production bodies. The change is justified, however, in the event of a new tooling program for an entirely new body.

From the standpoint of die casting, K-F feels that Doehler-Jarvis has the situation well in hand. This part requires the use of an exceptionally large die-casting machine, developing a die locking pressure of 1000 tons. The die used for this purpose weighs 13 tons and has a surface area of about 1200 sq in.

It is also in the cards that if and when aluminum die castings are developed for regular production application, tangible economies can be effected by centralizing the entire door operation at Willow Run. For example, if door production were set up on a line basis at the home plant, the door department could also include die-casting equipment. Thus the die castings would be made right on the spot; the outer panels produced in the press shop as at present; and the entire assembly completed on a single line with maximum economy of materials movement and materials handling.

Die-Cast Body Parts

(Continued from page 35)

Learning Your Clutch Needs	Brawn for the Biggest ----- with -----	Automotive and Aircraft
Analysing the Problem	OVER	Trucks and Busses
Designing the Clutch		Tractors and Road Machines
Planning Production	ROCKFORD	Farm Machines and Implements
Tooling Up	CLUTCHES	Oil Field Rigs and Pumps
Manufacturing	As original equipment in the world's largest tractor and in the truck that has been America's first choice in the over 16,000 pounds class, for 17 years, ROCKFORD CLUTCHES are serving dependably in the heaviest duty work. Other ROCKFORD CLUTCHES are serving equally well in precision machines that perform the most minutely adjusted operations. Whether your need is for maximum torque transmission or for minimum engagement shock, there is a ROCKFORD CLUTCH that is exactly suited to your specific requirements. A request from your engineering department will bring information about the ROCKFORD CLUTCH that will serve best in your product.	Industrial
Checking and Testing		Mowers and Light Machines
Supervising Installation		Engines and Marine Units
Servicing		Machine Tools Production Units
	ROCKFORD CLUTCH DIVISION BORG-WARNER 315 Catherine Street, Rockford, Illinois	

Simplified gaskets cut sealing costs

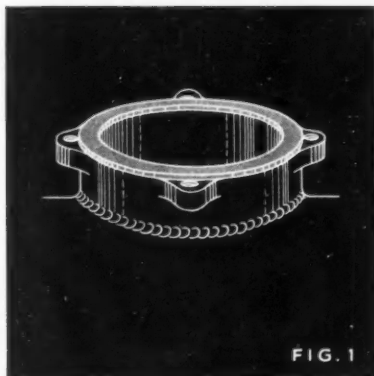


FIG. 1

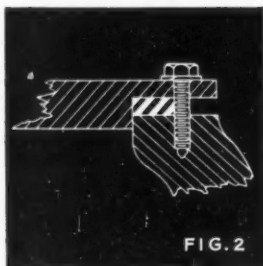


FIG. 2

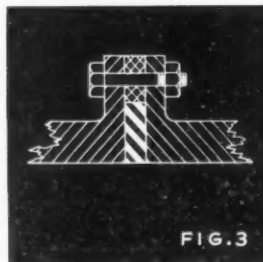


FIG. 3

Gaskets with projections around bolt holes often can be redesigned to eliminate such ears and still provide a tight seal. Gasket costs ordinarily can be cut in this way wherever it is not necessary to seal around bolts or prevent moisture accumulation between flanges.

Ears can be removed in almost every case where they are used simply to hold a gasket in position. The resulting unrestrained gasket will remain firmly seated if it is made from a material that will deform in the direction of the load without appreciable sideflow. Armstrong's Cork-and-Rubber Compositions meet this requirement. Because these compositions are truly compressible, they have no tendency to creep. In addition, their exposed cork particles provide surface friction that further inhibits lateral movement.

Compressible gaskets stripped of ears or other dispensable projections obviously are less expensive to manufacture. Even greater savings often are possible if the resulting shape is circular. Then

gaskets can be lathe-cut automatically from tubes—with almost no waste.

The hand hole cover gasket in figure 1 illustrates a typical application where Armstrong's Cork-and-Rubber Gaskets reduce sealing costs by eliminating the need for ears. Accurate positioning is insured by making the O.D. of the gasket tangent to the edge of the bolt holes.

Another application is the transfer case flange shown in figure 2. Here the cork-and-rubber gasket provides an effective low-cost seal. Its true compressibility prevents creep and its solvent resistance is comparable to the straight synthetic it replaced.

In figure 3, cost-saving rings are used in conjunction with a metal shim to insure positive gasket alignment and prevent excessive gasket compression.

Removing ears is only one of the ways that you can reduce sealing costs with Armstrong's Cork-and-Rubber. We suggest that you ask your Armstrong representative how these versatile materials can help you.



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obtain expert advice both in selecting and applying them. This we are prepared to furnish.

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TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM

UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST TO COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

	AUTOMOBILE, LIGHT TRUCK, TRACTOR						HEAVY TRUCK	DIESEL ENGINE
	Arms and Knuckles		Axles and Shafts		Universal Joints	Sway Eliminator Bars	Crank Shafts	Crank Shafts
Tensile Strength Range, psi.	125,000 to 165,000	150,000 to 200,000	150,000 to 200,000	175,000 to 225,000	125,000 to 175,000 (Core)	140,000 to 170,000	140,000 to 170,000	100,000 to 125,000
Mn	1340		1330	1340				
Ni Cr	3130, 3135, 3140		3140, 3145					
Mo	4047, 4053		4063, 4068			4068		
Cr Mo	4135, 4142		4140, 4145, 4150			4140	4142	
Ni Cr Mo		4337, 4340		4340, 4345	4317, 4320		4340	
Ni Mo			4640		4617, 4620			
Cr	5132				5120	5145, 5150, 5160	5145	5046, 5145
Ni Cr Mo	8640, 8642, 8645		8640, 8650	8653	8650			
	8740, 8742		8740, 8750		8720			
		9840		9840, 9845				

	STEERING WORM AND SECTORS		OVERDRIVE CASES	PISTON PIN BUSHINGS	INTAKE VALVES	PUMP SHAFTS	COUNTERSHAFT AND OTHER PINS	
Tensile Strength Range, psi	115,000 to 160,000 (Core)	175,000 to 250,000	150,000 to 190,000 (Core)	115,000 to 160,000 (Core)	125,000 to 160,000	125,000 to 160,000 (Core)	125,000 to 160,000 (Core)	175,000 to 240,000
Ni Cr					3140			
Cr Mo					4140			4130, 4140
Ni Mo	4620		4820			4620	4620	
Mo							4027, 4032	
Cr	5120	5132, 5135		5120			5120	5135, 5140
Cr V				6120				
Ni Cr Mo	8620						8620	
	8720				8740			
Cr Mo Al						Nitriding Steel		

CARNEGIE-ILLINOIS STEEL CORPORATION

for automotive applications

Tensile Strength Range, psi	AUTOMOTIVE, LIGHT TRUCK, TRACTOR GEARS			HEAVY TRUCK, HEAVY TRACTOR, BUS GEARS	
	110,000 to 150,000	150,000 to 200,000	250,000 to 300,000	110,000 to 150,000	150,000 to 200,000
Mn	1320		1340	2340, 2345	2317
Ni				2512	2515, 2517
Ni Cr					3310, 3316 SuperKore AA
Mo	4023, 4027, 4028, 4032				
Cr Mo			4140	4140, 4145	
Ni Cr Mo		4320 SuperKore C	4340	4340	4320 SuperKore C
Ni Mo	4620	4815 SuperKore B		4620	4820 SuperKore B
Cr	5120	5132	5135, 5140, 5145		
Ni Cr Mo	8615, 8620, 8622		8640	8640, 8645, 8650	8620
	8720		8740	8740, 8745, 8750	8720

CARNEGIE-ILLINOIS STEEL CORPORATION

	AUTOMOBILE AND LIGHT TRUCK SPRINGS		LARGE TRUCK AND BUS SPRINGS	TRACTOR SPRINGS	
	Leaf Springs	Coil Springs	Leaf Springs	Leaf Springs	Coil Springs
Mo	4063, 4068	4063, 4068			
Cr	5147, 5150, 5152, 5160	5160	5160		
Cr V	6150		6150	6150	6150
Ni Cr Mo			8655	8655, 8660	8660
Si Mn	9260	9260	9260	9260	9260
Si Mn Cr	9261		9261, 9262	9261, 9262	9261

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9-1648

UNITED STATES STEEL

Tractor Highlights

(Continued from page 43)

shovels, scrapers, graders, and special machinery. The ability to compete with conventional cable controls is attributed to improvements in control valves and accessories and increasing power ratings for hydraulic units. Hydraulic systems are being operated with fluid pressures up to 1000 psi and in time it should be feasible to get up to 3000 psi for heavy earth moving machinery. Hrdlicka emphasized that hydraulic power is still in its early stages of

development and requires considerable research in the solution of problems of application and service. It was apparent that this is a controversial subject at the present time, judging by comments made by a representative of the Heil Company. In his opinion, cable controls are preferable for heavy equipment while hydraulic power is desirable for light machinery in the present state of the art. He mentioned that Heil is producing a compact power

package which can be readily installed on light machinery. The company also supplies hydraulic power steering which is said to be effective in relieving the operator of the task of steering heavy earth moving equipment and also in insulating him from road shock.

Standardization Emphasized

A progress report on the standardization of hydraulic cylinders and other accessories for farm equipment was presented by W. H. Worthington, the objective being an interchangeability of such elements both dimensionally and functionally. The project has been attacked from two angles—general purpose equipment typical of row crop farming; and heavy tillage equipment such as is common west of the Rockies. The standard aims at standardization of double-acting cylinders as well as the definition of the range of thrust required for various types of implements. It is contemplated that the standard will consider the cylinder and hose as part tractor equipment while hose supports will be part of the implements.

Stress and Horsepower Studied

That scientific research methods can be applied to the study of heavy duty earth moving equipment was demonstrated by Trevor Davidson and John H. Meier, Bucyrus-Erie Co., in a paper describing studies of stress analysis of excavating machine elements under actual service conditions. Some of these machines are enormous in size and in all cases test procedure involves considerable difficulty because of the inaccessibility of highly stressed elements. At the present time the studies have been confined to dynamic testing aimed primarily at the collection of related data suitable for later analysis. Much of the test work has been done with the Baldwin-Southwark SR-4 electric strain gage which has been employed extensively in the automotive field. One result of this work was proof that peak torque output of an engine at stall rose to a value of 240 per cent of full load torque, demonstrating as one discussor put it, the validity of the rule-of-thumb formula that impact loading is about double the static load. The important work outlined in the paper is being continued and expanded and is expected to throw considerable light on the design of heavy machinery. Later discussion showed that Marion and several other manufacturers were employing methods of stress analysis using strain gages as well as Stresscoat. A symposium on the utilization of horsepower in earth moving equipment featured a group of three papers and some excellent action films. In the field of high speed hauling, J. P. Carroll, Caterpillar Tractor Co., analyzed the role of the rubber-tired tractor and scraper or wagon units, offering proof of the superiority of such equipment on earth moving

(Turn to page 87, please)

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11. New Products Laboratory
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13. New Products Evaluation Lab.
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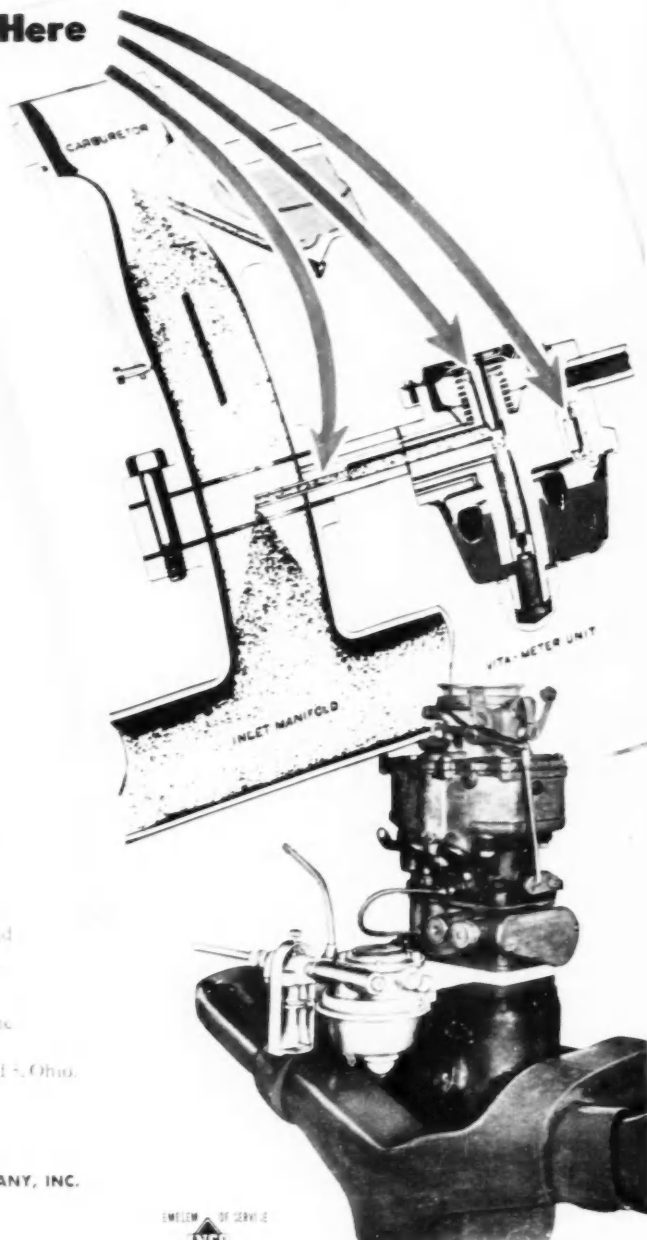
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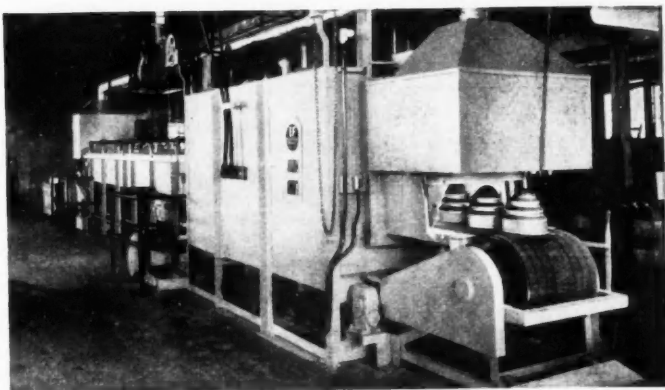
projects where hauls are long and haul roads favorable. This superiority rests with the capability of maintaining high average speeds, admittedly the controlling criterion in the hauling cycle. High average speed, in turn, is related to many factors such as—rolling resistance, grade resistance, gear selectivity, traction, power, and capacity. The inter-relation of these factors is discussed in the paper. Another slant was given by H. L. Rittenhouse, the Euclid Road Machinery Co., in describing large earth-moving machinery in which large horse-power is utilized for moving very heavy loads at something less than a maximum speed limited only by road conditions and personal safety. In addition to specialized heavy machinery fitted with single engines of large output, Euclid has done considerable work with dual engine drives in certain types of vehicles. It is claimed that the use of two engines results in lower cost per hp and lower maintenance costs; as well as lower cost for units such as clutches, transmissions, axles, propeller shafts, etc. The third analysis by John E. Marson of Bucyrus-Erie Co., is a searching comparison of the economics of large earth-moving machinery contrasted with small or medium-sized equipment for performing the same tasks. While this study outlines the advantages and limitations of both types, the author presents a strong case for the large, slower speed but good average speed type of machinery. Unquestionably a study of these three papers will prove to be of real value to the users of earth-moving equipment.

Dirt Exclusion Discussed

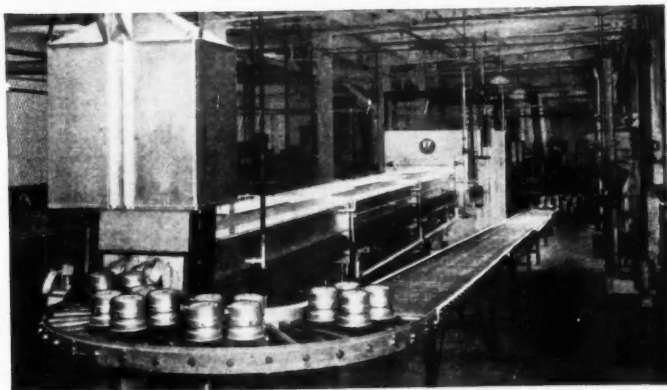
Of the variety of automotive equipment produced by industry, it is fair to say that agricultural and earth-moving machinery are most vulnerable to the effects of dust and dirt. The role of modern seals for lubricant retention and dirt exclusion was pictured by S. C. McCombs and R. O. Isenbarger of Chicago Rawhide Mfg. Co. They described a wide variety of applications in tractors and implements employing various types of materials including—felts, leather, and synthetic rubber, depending upon the nature of the job. The proper application and selection of oil seals is a rather involved process, requiring the study of numerous factors incident to a particular problem. Among other things, it is necessary to specify the character of dirt and foreign materials to be excluded, as well as the nature of oil, grease or fluid to be retained. Along with this are the considerations of the installation itself, including dimensional tolerances which, in the opinion of the authors, are too rigid much of the time. Were it not for the air cleaner, farm equipment simply could not be operated without wearing out prematurely. The unique place of the air cleaner on tractor engines was defined by W. W. Lowther, Donaldson Co., Inc., who naturally con-

(Turn to page 88, please)

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siders the device as one of the most important accessories on the engine. The gist of his paper is that the best design of oil-bath air cleaner is 99 per cent efficient. Because of the law of diminishing returns a further increase of $\frac{1}{2}$ of one per cent would hardly be economically sound because of the expense and size of the new unit. On the other hand, the proper location of the air inlet plays more of a role than increased air cleaner efficiency. Their field test work has shown that mounting the air inlet with an 18-in. extension over the top of the radiator reduces dust concentration to 0.002 grams per cu ft. Now if the inlet were left at the

dash position—where it is usually—and cleaner efficiency increased to a maximum of 99.5 per cent, the dirt entering the engine would amount to two pounds per thousand hours. By merely changing the inlet location this could be reduced to 0.5 lb per 1000 hours. This extra protection must be achieved at the expense of eye appeal, of course. The question for the tractor designer to resolve is whether appearance or service life is most important.

Induction Hardening Viewed

Certainly one of the most informative sessions at the meeting was the symposium on induction hardened tractor

gears, featuring a remarkable motion picture film in black-and-white and in color showing close-ups of the many of the production set-ups for gears and shafts in several International Harvester plants. The film was produced personally by H. F. Kincaid, co-author of the paper with H. B. Knowlton, both authors being with IHC. The first of the papers of this group by John A. Redmond of Westinghouse Electric Corp., dealt largely with early development of equipment and techniques for hardening gears by induction. Much of the experimental work was pointed at problems posed by IHC and later the two organizations joined forces to develop production techniques and equipment cooperatively. One of the results of initial work was recognition that for large gears of coarse pitch it was necessary to preheat the gear with a-f current, then harden with r-f current. The IHC report actually was in two parts, first the explanatory film showing the results of induction hardening work as translated in successful high production methods; and second a discussion by Knowlton of the proving of the new technique by service performance tests, using accelerated testing techniques. The sum and substance of the report is that IHC is replacing case hardening of gears and certain shafting by induction contour hardening practice. Knowlton showed by results of fatigue tests on special four-square machines that induction hardened gears are being produced with quality perfectly adequate for maximum service requirements. In general, the equipment illustrated by Kincaid was designed for automatic cycles with mechanical handling of work in and out of fixtures, except in the case of extremely large gears. As a general rule all parts are rotated in the fixture while being heated and while being quenched. Depending upon the nature of the work, IHC uses either water or oil for the quenching medium and quenches either by immersion in a tank or while in the inductor block, again depending upon the job. Immersion quenching is done with oil under high pressure. One enormous high speed induction hardening machine for gears is capable of hardening and quenching 550 gears an hour, the only function of an operator being to load and unload the conveyor. To speed up the preheating cycle gears are presented successively under four preheat stations, each one of 9600 cycle frequency. The fifth head is an r-f unit for hardening. An outstanding example of how they handle real big gears is the setup for induction hardening a gear 32 in. in diameter with $4\frac{1}{2}$ in. face. Too large for practical preheat by induction methods, it is preheated to 600 F in a furnace, then induction heated for 80 seconds. It is water quenched by immersion in a tank below the inductor, then tempered in a furnace to relieve strain. Although induction hardening of gears and shafts is

(Turn to page 90, please)


EVERY PART IS RIGHT




Complete testing facilities such as the tensile test machine (left) and the chemical laboratory (below) help assure rigid control over every phase of manufacturing Yates-American quality radiators.



In Quality Radiators

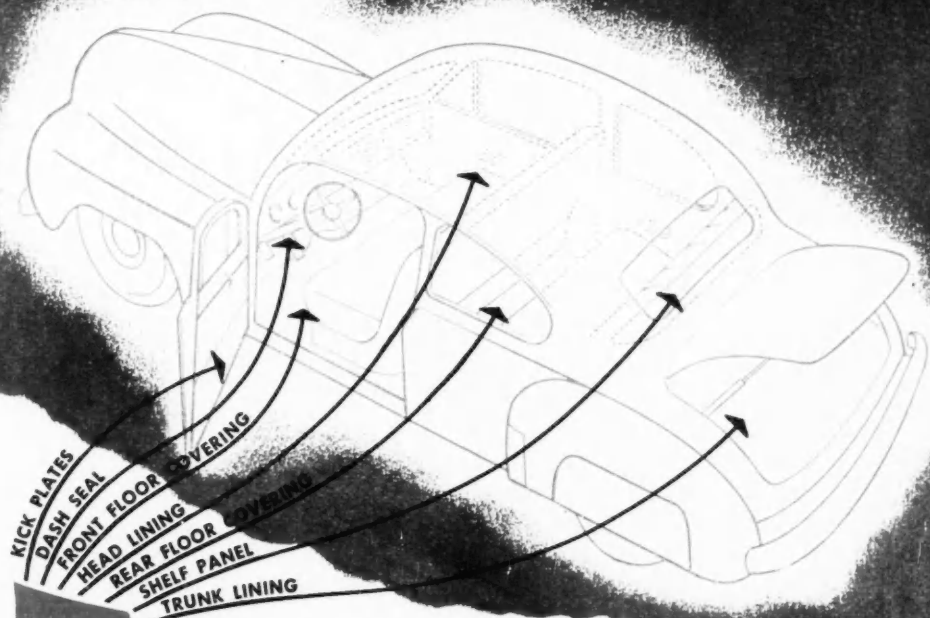
One way to build top-quality engine cooling radiators is to control every step in their production — produce each component part, take no chances on outside sources. That's why you can be sure  radiators are right . . . because Yates-American controls every step of production, from materials to finished product.

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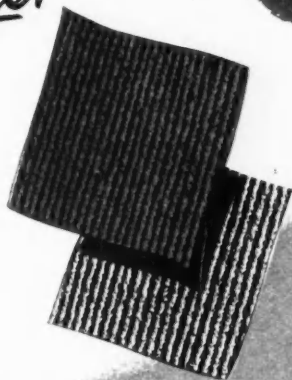
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still a controversial subject, IHC has made its decision on the basis of demonstrated performance and has swung its program entirely to the new technique. Another paper of major interest was a description of the variety of gear drives for implements by E. E. Eaton of Clark Equipment Co., including power take-off units for mowers, side delivery rakes, grain delivery spout drive, self-propelled harvesting units, etc. It is the hope of the author that some time in the future consideration may be given to a program of standardization of these types of gear drives in the interest of lower cost as

well as better opportunity for improvement in design and utility.

Effect of Farming on Design

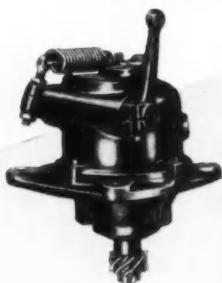
That new agricultural techniques, including soil conservation promise to create major changes in the design of tractors and farm implements was visualized by several speakers. Describing some of the conservation farming and control measures being adopted by farmers, G. E. Ryerson, U. S. Department of Agriculture, explained that both measures change farming operations and with it, farm machinery requirements. Mulch farming, one of the

new practices, drastically revises requirements for tillage, planting, and harvesting equipment. The seedbed must be prepared without damaging the surface mulch, without causing excessive compaction or pulverizing, and without damaging contour areas. The same relationships, particularly with respect to new cultivating methods, have tended to upset the happy partnership between farm implement and farm tractor engineers. From now on they will have to work together to produce mating combinations of tractors and implements capable of meeting the operating demands. Biggest headache is that the farmer expects the smallest tractor to do the same kind of work as does the big unit. For example, the split or mulch planter is expected to have considerable potential. The largest row crop tractors have sufficient draft to pull a two-row planter of this type but it is difficult to see how planter-combines can be adapted to smaller tractors. The demand for cultivators, pulverizers, spray units, and other devices including flame cultivators, can be realized by two modes of approach S. D. Pool, International Harvester Co., suggested. One is the design of a tractor that shrinks itself to a width that will pass between rows, as is done by several sulky type garden tractors. The other answer is increased tractor clearance up to the 80-in. required for corn detasselling operations.



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Oil Column Pierces Holes in Steel

A practical method which uses oil to pierce holes in steel has been devised by the Schenectady Works Laboratory of the General Electric Co. The new system substitutes a column of oil for the punch, and the size and shape of the hole follow the form of a die placed under the sheet being punched.

In operation, the column of oil is struck hard at the top. Since it is confined in all directions and cannot be compressed, the oil is forced to punch through the steel sheet which forms the bottom of the column and into the hollow area of the die under the sheet.

Greatest advantage of the "liquid impact" method is said to be the saving of cost in making and replacing metal punches which often have intricate shapes. Silicon sheet steel, being hard and brittle, wears out metal punches rapidly. The oil used in the new method, on the other hand, does not wear out but is recirculated and formed into a new "punch" over and over again. Another advantage of the new method is that "soft" steel dies may be used.

The liquid-impact method is still in an experimental stage, but its use in industrial processes is well within the realm of possibility.

DUREX-100 ENGINE BEARINGS FILL THE BILL

The development of higher speed engines necessitated engine bearings with superior properties of conformability, embedability, resistance to corrosion and fatigue cracking.

Moraine engineers called upon years of metallurgical know-how and experience to provide the answer. Through research, laboratory and field tests, they determined that such a bearing could be produced by bonding a special corrosion-resistant high lead base babbitt to an intermediate layer of steel-backed sintered copper and nickel.

The result was DUREX-100 ENGINE BEARINGS.

Today, the wide acceptance of Durex-100 bearings on Cadillac, Buick, Oldsmobile, GMC Trucks, and other automobiles and trucks demonstrates their satisfactory application to modern high speed engines.

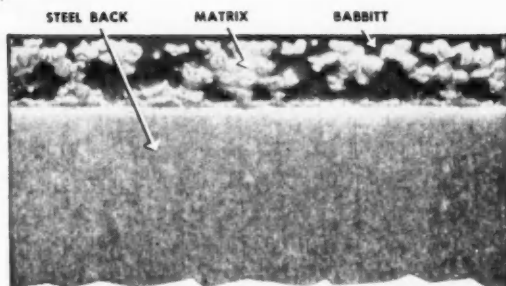


PHOTO-MICROGRAPH OF CROSS SECTION OF DUREX-100 BEARING. MAGNIFIED 33 TIMES

THE MATRIX MAKES THE DIFFERENCE

Steel-backed intermediate matrix of porous copper-nickel bonds mechanically, as well as metallurgically, with thin high lead babbitt overlay.

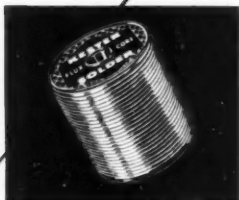
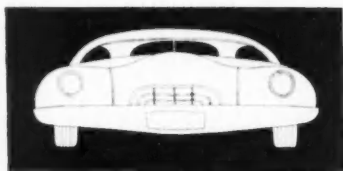
MORaine PRODUCTS DIVISION OF **GENERAL MOTORS**
DAYTON, OHIO

DUREX-100 ENGINE BEARINGS . . . BY MORaine



50 Years of Progress with Kester Solder

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for good automotive assemblies
even as they were in those early days.



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**KESTER
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Business in Brief

Written by the Guaranty Trust
Co., New York. Exclusively for
AUTOMOTIVE INDUSTRIES.

Business activity declined generally during the week ended Sept. 24. Department store sales, electric power production, railway freight loadings, bituminous coal production, and construction were lower than in the preceding week, while crude oil output advanced. The *New York Times* index of activity for the week ended Sept. 24 stands at 138.2, as compared with 140.8 in the preceding week and 147.9 a year ago.

Sales of department stores during the week ended Sept. 24, as reported by the Federal Reserve Board, equaled 292 per cent of the 1935-39 average, as compared with 315 in the week before. Sales were eight per cent below the corresponding distribution a year ago, as against a preceding decline of seven per cent. The total in 1949 so far reported is five per cent less than the comparable sum in 1948.

Electric power production declined contraseasonally during the week ended Sept. 24. The output was 1.7 per cent above the corresponding amount in 1948, as compared with a similar advance of 2.8 per cent shown for the preceding week.

Railway freight loadings during the same period totaled 661,472 cars, 11 per cent less than the figure for the week before and 29.5 per cent below the corresponding number recorded in 1948.

Crude oil production in the week ended Sept. 24 averaged 4,875,400 barrels daily, 39,100 barrels more than in the preceding week but 457,500 under the comparable output in 1948.

Production of bituminous coal and lignite during the same week is estimated at 1,950,000 net tons, 6,485,000 less than the output in the week before and 16,268,000 below the corresponding quantity in 1948.

Civil engineering construction volume reported for the week ended Sept. 29, according to *Engineering News-Record*, was \$162,897,000, or 13 per cent less than the preceding weekly figure but 28 per cent above the comparable sum in 1948. The total recorded for 29 weeks of this year was 29 per cent more than the corresponding amount in 1948. Private construction for the period was 18 per cent above that a year ago, and public construction increased by 21 per cent.

The wholesale price index of the Bureau of Labor Statistics during the week ended Sept. 27, at 152.4 per cent of the 1926 average, was 1.1 per cent less than in the preceding week and 9.2 per cent below the corresponding figure in 1948. Declines were registered in all major commodity groups, with the exception of fuel and lighting materials, which increased, and building materials, which showed no variation.

Member bank reserve balances increased \$256 million during the week ended Sept. 28. Underlying changes thus reflected include an increase of \$764 million in Reserve bank credit and decreases of \$17 million in money in circulation and \$3 million in Treasury cash, accompanied by an increase of \$369 million in Treasury deposits with Federal Reserve banks.

Total loans and investments of reporting member banks increased \$169 million during the week ended Sept. 21. An advance of \$118 million in commercial, industrial, and agricultural loans was recorded. The sum of these business loans, \$13,289 million, shows a net decrease of \$1912 million in 12 months.

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Oil Seal Needs
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1800 SIZES
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Among the 14 different types of Perfect Oil Seals, one or more will usually meet your sealing requirements, no matter how critical. Such conditions as shaft end movement—intermittent speeds—exceptional exposure to grit, dirt and moisture—extreme high speeds—very low speeds and other troublesome sealing requirements are adequately met by standard types of Perfect Oil Seals.

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OUR **71ST**
YEAR
OF INDUSTRIAL
SERVICE

BOOKS...

METAL FINISHING, Guidebook-Directory, 18th Annual Edition. Published by *Finishing Publications, Inc.*, 11 West 42nd St., New York 18, N. Y. Price \$2.00. This reference manual contains up to date practical information on electroplating, cleaning, polishing, buffing, and related subjects. There is a list of suppliers and manufacturers of plating and finishing supplies in the directory section. This book is concerned only with metallic coatings.

THE AIRPLANE AND ITS ENGINE. by *C. H. Chatfield, C. Fayette Taylor, and Shatswell Ober.* Published by *McGraw-Hill Book Co., Inc.*, New York, N. Y. Price, with cloth cover, \$4.50.

This book is intended primarily for those readers who desire knowledge of the basic principles of the airplane and its power plant and a view of recent developments. The material is so presented that a minimum knowledge of physics or mathematics

is necessary for its understanding. Due to many aeronautical changes since the 1940 edition, a chapter on jet, turbine, and rocket power plants has been added.

AUTOMOTIVE TRANSPORTATION — TRENDS AND PROBLEMS. by *Wilfred Owen.* *The Brookings Institute*, 1949; 154 pp.; \$2.00.

The substance of this study is an examination of the cost and quality of automotive transportation and an analysis of past trends and significant factors governing the automotive future. Since transportation by motor vehicle is made possible through the joint efforts of industry and government, attention has been directed to the role which each plays in providing the final service. Particular emphasis is placed on the economics of automobile design and the problem of providing highways capable of meeting the heavy demands of traffic.

SYMPOSIUM ON INDUSTRIAL GEAR LUBRICANTS. This Symposium, with three technical papers, was arranged by Committee D-2 on Petroleum Products and Lubricants to provide experiences and data on the properties of industrial gear lubricants which may need to be investigated in connection with the establishment of test methods, nomenclature, and specifications.

Copies of this 24-page publication, with heavy paper cover, can be obtained from *A.S.T.M. Headquarters, 1916 Race Street, Philadelphia 3, Pa.*, at 75 cents each.

FUELS AND LUBRICATING OILS FOR INTERNAL COMBUSTION ENGINES. by *B. Pugh & J. M. A. Court.* *Pitman Publishing Corp.*, N. Y., 1949; 169 pp.; \$3.50.

This book is a concise text dealing in a comparatively elementary manner with the wide subject of fuels and lubricating oils for internal combustion engines. Since some basic knowledge of hydrocarbon chemistry is essential to an understanding of the nature of petroleum products, the opening chapter introduces the reader to the structure, nomenclature, and properties of paraffins, olefins, aromatics, and naphthenes. In keeping with the purpose of this book, clear, concise statements take the place of long, complex dissertations of other volumes written for fuel chemistry specialists who are well versed in the manipulation of formulae and higher mathematics.

DYNAMIC EQUIPMENT POLICY — A MAPI STUDY. by *George Terborgh.* *McGraw-Hill*, 1949; 290 pp., \$3.75.

To help meet an important management need, this book develops the basic principles of sound re-equipment analysis and discusses practical procedures for their application. It illustrates procedures by numerous examples taken from actual experience; then, in the light of these principles and procedures, it appraises the more popular devices and rules of thumb now in use, showing the errors and frequent absurdities to which they lead.

DAS TRIEBWERK SCHNELLAUFENDER VERBRENNUNGSKRAFTMASCHINEN (The Crank Train of High-Speed Combustion Engines). by *Dipl.-Ing. H. Krenser.* Second revised edition. Published by *Springer-Verlag, Vienna, Austria.* Paper covers, \$7.20.

The book here under review deals with the design of the various parts of the crank train; that is, with pistons, piston rings, piston pins, crankshafts, connecting rods, and engine bearings. The dynamics of the crank train, however, is not included, and evidently is covered in another volume of the set entitled *The Dynamics of the Combustion Engine*. The treatment follows the usual style of technical handbooks or textbooks, covering the materials used for the various parts, the principles on which the design is based, including production considerations, and the dimensioning of parts.

TREATISE ON POWDER METAL LURGY—Volume I, Technology of Metal (Turn to page 96, please)

Essential... to TOP PERFORMANCE

In Today's High-Efficiency
Cars and Commercial Vehicles

DOLE

New-Type "DV" Thermostats

Designed to meet the needs of the modern cooling system, Dole "DV" Thermostats have long life power to control high pump pressures. Full seating pressure gives quick warm-up and operation is not affected by the installation of a pressure cap. All these factors contribute to improved cooling. New type thermal element proved in use for many years in other thermostatically-controlled products. Four types give broad coverage of design needs.



DV-1



DV-2



DV-3



DV-4

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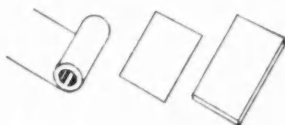
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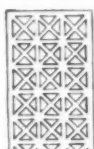


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SHEET AND PLATE



EMBOSSED AND PERFORATED SHEET



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Stucco, Rib
Lengthwise,
Rib Crosswise,
Diamond,
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Four Perforat-
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Cane, Union
Jack Style
A-1, Large X

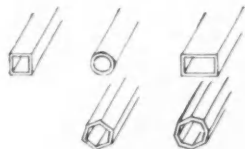
WIRE, ROD, BAR AND FORGING STOCK



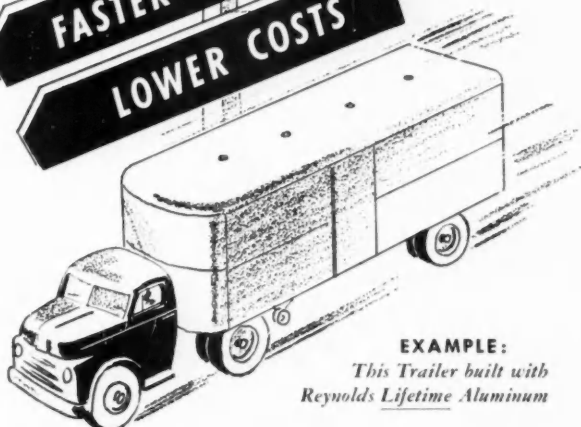
STRUCTURAL AND EXTRUDED SHAPES



TUBING AND PIPE



The ALUMINUM OUTLOOK



EXAMPLE:

This Trailer built with
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RUGGED trailer-tractor combinations can now carry 10 to 25% more payload—without violating state highway load limits. Cargo is substituted for dead weight when these "big jobs" are built with aluminum. Less net weight means longer tire wear, faster transportation and less fuel per ton mile. Maintenance cost is cut, longer life assured when Reynolds *Lifetime* Aluminum is specified.

See how aluminum with its many advantages— $\frac{1}{3}$ the weight of ordinary metals, no red-rust threat, often no finishing costs, more eye appeal—offers production and sales benefit for your product. Call the nearest Reynolds Distributor or Sales Office, listed under "Aluminum" in your classified telephone directory, or write Reynolds Metals Company, Aluminum Division, 2513 South Third Street, Louisville 1, Kentucky.

Alloy Data Structural Design Finishes
Heat Treating Machining Welding

Request any of these helpful, illustrated booklets on your company letterhead and they'll be mailed to you without charge. Informative and understandable, you can use them to answer questions relating to your design and production. Just write to address above.



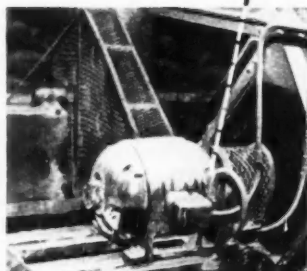
REYNOLDS *Lifetime* ALUMINUM

CONSIDER ALUMINUM — CONSULT REYNOLDS — THE COMPLETE ALUMINUM SERVICE

Silicone News



*Here's where
DC Silicone Insulation
Saved \$700 per hour*



It cost Standard Gypsum Company of California about \$700 per hour every time heavy overloads caused the 25 h.p. motor driving screw conveyors in the mixing house to fail. And such expensive motor failures were occurring every 30 to 60 days until the silicone insulated 10 h.p. motor shown above was installed in December, 1948.

This silicone insulated motor is only about $\frac{1}{2}$ the size and weight of the motor formerly used, yet, it is still performing the same work after 8 months without failure. That's what is meant when we say Dow Corning Silicone Electrical Insulation gives you more power per pound, greater reliability, reduced maintenance costs and increased production.

Every day, more and more engineers are specifying DC Silicone Electrical Insulation in motors exposed to excessive heat, moisture, or heavy overloads. If you would like to learn why these engineers are relying on Silicone Insulation, phone our nearest branch office or write for booklet C-10.

DOW CORNING CORPORATION MIDLAND, MICHIGAN

Atlanta • Chicago • Cleveland • Dallas
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In Canada: Fiberglas Canada, Ltd., Toronto
In England: Albright and Wilson, Ltd., London

Photo courtesy Standard Gypsum Company of California

FIRST in Silicones

OW
orning

Powders and Their Products by Claus G. Gostzel, Ph.D. Published by Interscience Publishers, Inc., New York, N. Y. Cloth \$3.50, 806 pages, 300 illustrations, 82 tables, \$15. This encyclopedic treatment of powder metallurgy presents 20 chapters of principles, history, theory, experiment, technology, properties, production, and application. The fundamentals covered by this volume equip the reader to understand the most recent evolution of the art, such as structural iron and steel components, "infiltrated" powder metal products, superalloys, new magnetic materials, and combination materials (metal-metalloid and metal-ceramic).

CALENDAR

Conventions and Meetings

- Amer. Soc. for Testing Materials,
Pacific Nat'l Mfg., San Francisco
Oct. 10-14
- Amer. Society for Metals Nat'l Metal
Congress & Exhibition, Cleveland,
Ohio Oct. 17-21
- Amer. Welding Soc. Annual Mtg.,
Cleveland Oct. 17-21
- Amer. Inst. of Mining & Metallurgical
Engineers Metals Br., Cleveland
Oct. 17-21
- 10th Annual Mtg. & Dinner Automob-
ile Old Timers, New York City Oct. 18
- Nat'l Safety Council Safety Congress
& Exhibit, Chicago Oct. 21-28
- Nat'l Metal Trades Assoc., Annual
Convention, Chicago Oct. 26-28
- Amer. Soc. Tool Engineers Semi-An-
nual Mtg., Montreal Oct. 27-29
- SAE Diesel Engine Mtg., St. Louis, Nov. 1-2
- Amer. Society Body Engineers An-
nual Tech. Convention, Detroit, Nov. 2-4
- SAE Fuels & Lubricants Mtg., St.
Louis Nov. 3-4
- Chicago Auto Show, Chicago Nov. 4-12
- Society for Experimental Stress An-
alysis Annual Mtg., New York
Nov. 30-Dec. 2
- Nat'l Motor Boat Show, New York
City Jan. 8-14
- SAE Annual Mtg., Detroit Jan. 9-13
- Plant Maintenance Show, Cleveland
Jan. 16-19
- Nat'l Auto. Dealers Assoc., Atlantic
City Feb. 5-8
- Nat'l Auto. Access. Mfrs. Assoc. An-
nual Expos., New York City Feb. 6-10
- Pacific Automotive Show, San Fran-
cisco Feb. 16-19
- ASTM Spring Mtg., Pittsburgh
Feb. 27-Mar. 3
- Amer. Road Builder's Assoc., Cincin-
nati March 6-9
- SAE-Passenger Car, Body & Produc-
tion Mtg., Detroit Mar. 14-16
- Amer. Soc. Tool Engineers Industrial
Expos., Phila. April 10-14
- SAE Aeronautic & Aircraft Eng. Dis-
play, New York City April 17-19
- 3rd Highway Transportation Con-
gress, Washington Apr. 26-27
- International Motor Show, Turin, Italy
May 4-14
- Automotive Engine Rebuilders Assoc.
Annual Convention, St. Louis May 18-19
- A.S.T.M. Annual Mtg., Atlantic City
June 26-30

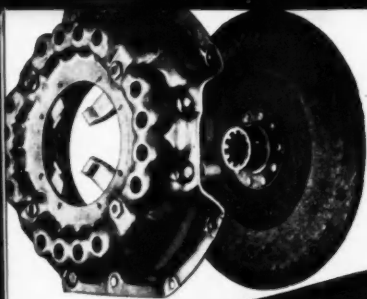
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at the National Metal Con-
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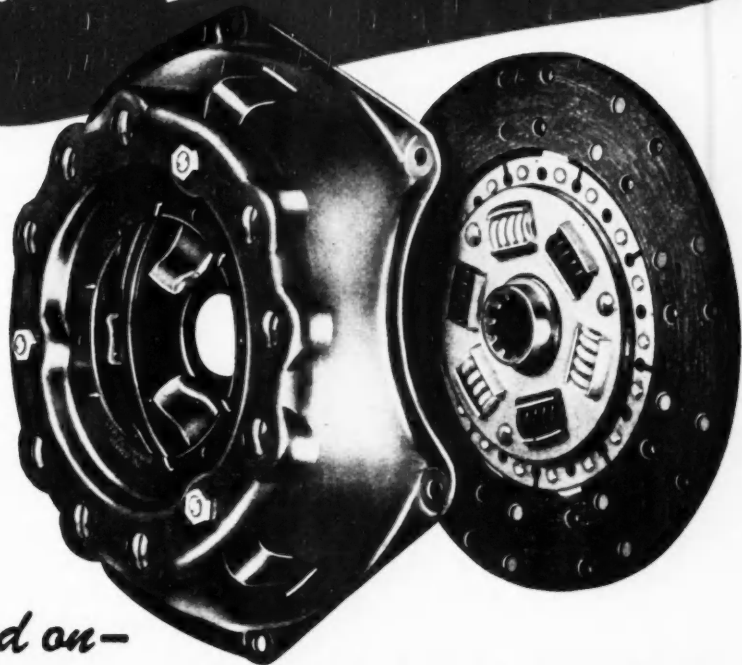
means...designed and built with the precision
which has each year, for thirty-five years,
made Borg & Beck clutches famous for

**QUIETER OPERATION-SMOOTHER PERFORMANCE
LONGER LIFE**



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You can depend on—

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For that vital spot where Power takes hold of the load!

THE STANDARD CLUTCH — A Product of BORG-WARNER

General News

(Continued from page 23)

Tell Berna Lists Two Output Bottlenecks

Tell Berna, general manager, National Machine Tool Builders' Association, told members of the Philadelphia Chapter of the American Society of Tool Engineers at a regional meeting in Philadelphia recently that two misconceptions, one by labor and one by

management, are hampering potential productivity. The assumption on the part of some labor leaders that new and better machines throw people out of work, leads to resistance to the installation of new machines, or to limiting output on the new machine to that of the machine replaced, he stated. Coupled with this is the fact that too many men in management assume that American industry, on the whole, is marvelously equipped. The fact is that the manufacturing plants of this country are still filled with machine tools of war and prewar vintage which have long since been obsoleted by postwar

models and represent high cost operation today, he declared.

Bell Aircraft Nets \$133,000 in First Half of 1949

A profit of \$133,332 was reported by the Bell Aircraft Corp. for the six months ended June 30. For the first six months of 1948, net loss was \$205,696. In the same period of 1947 the loss totaled \$210,394.

New Compound Withstands High Jet and Rocket Temperatures

Developed by the American Metals Corp., Yonkers, N. Y., under an Office of Naval Research contract, a new metallic compound, using zirconium and boron, has survived higher temperature blasts in recent tests than any material experimented with before. It is thought that the new compound may prove to be the answer to the search for new materials capable of withstanding the high (2000-3000 F) temperatures of turbine and rocket power plants.

Clark Directors See Equipment Demonstration

Recently assembled at Buchanan, Mich., for the regular quarterly meeting, directors of the Clark Equipment Co. witnessed an exclusive demonstration of the company's latest developments in materials handling equipment. This special showing, the first of its kind, was under the supervision of L. A. Bixby, vice president in charge of engineering.

Large Automobile Builders Have 25,000 Suppliers

Indicating the widespread economic contribution of the automobile industry, *Automobile Facts*, published by AMA, points out that a typical medium-sized company buys about 70,000 different items from approximately 7300 suppliers throughout the country. Large companies may have as many as 25,000 different suppliers. The publication states that the industry buys more than \$5 billion worth of material and supplies yearly in this country and in 55 foreign countries, and that expenditures for supplies total more than half the industry's total dollar receipts.

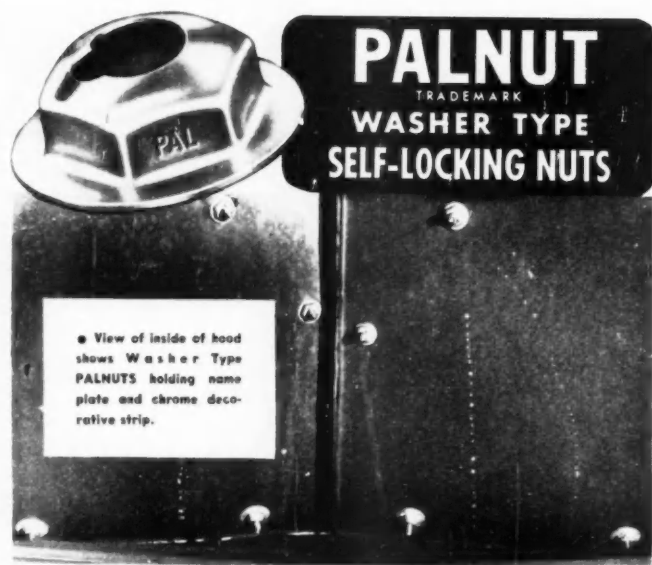
K-F's Ad Agency Names LeWald Manager of Willow Run Unit

Curtis C. LeWald has joined the William H. Weintraub and Co., Inc., advertising agency, as manager of its Willow Run, Mich., office and resident account executive on the Kaiser-Frazer account.

(Turn to page 102, please)

Low-cost, vibration-proof fastening

of Hood and Trunk Medallions, Moulding Strips, Tail and Parking Lights, etc.



• View of inside of hood shows Washer Type PALNUTS holding name plate and chrome decorative strip.

Inexpensive, one-piece PALNUT Washer Type, Self-locking Nuts perform the same function as an ordinary nut, lockwasher and plain washer combined. You not only save on parts and handling operations, but power drivers may be used to further speed up assembly.

The famous PALNUT double-locking action holds tight under vibration. Built-in washer spans holes and slots. Wide range of sizes available. Send details of your assembly for samples. Ask for literature showing entire line of PALNUTS for quick, secure fastening at low cost.

ONE part
instead of THREE



THE PALNUT COMPANY

60 Cordier St.

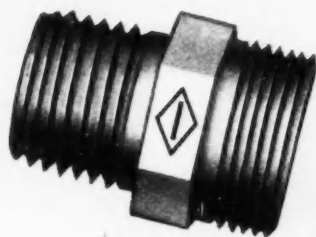
Irrington 11, N. J.

Detroit: 5-213 General Motors Bldg.

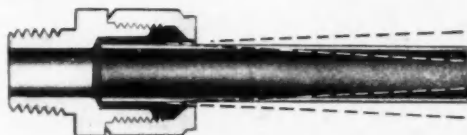
MILLIONS OF PALNUTS USED MONTHLY BY AUTOMOTIVE MANUFACTURERS

IMPERIAL FLEX FITTINGS

for connecting tubing where there is



This Sleeve Absorbs Vibration and Shock . . . The Flex Fitting embodies a sleeve of special synthetic elastic material which permits tubing to flex back and forth through the angle shown and at the same time assures a positive, pressure-tight seal.



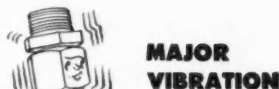
Flex Fitting Makes Joints Virtually Indestructible by Vibration . . . On tests where ordinary fittings failed after 73,000 cycles of vibration, Imperial Flex Fittings have withstood over 20,000,000 cycles without failure as indicated in the chart below:

COMPARATIVE VIBRATION TEST	
NUMBER OF VIBRATIONS IN CYCLES	20,000,000
Flare Fitting failed after 72,450 cycles	
Compression Fitting failed after 79,350 cycles	
Mil-Duty Fitting failed after 401,925 cycles	
FLEX FITTING showed no signs of failure after . . .	21,424,500 cycles

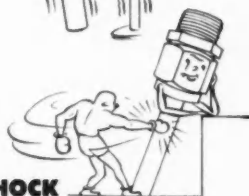
THE IMPERIAL BRASS MFG. CO., 1241 W. Harrison St., Chicago 7, Ill.

IMPERIAL

PIONEERS IN TUBE FITTINGS
AND TUBE WORKING TOOLS



**MAJOR
VIBRATION**



SHOCK



**MINOR
TUBE
MOVEMENT**

For All Kinds of Tubing . . . Imperial Flex Fittings can be used with all types of seamed and seamless metal tubing, including copper, aluminum, thin-wall steel, monel, stainless steel, etc.

Easy to Install . . . All that is necessary is to slip nut and Flex sleeve over tubing. Then insert tubing into fitting body as far as it will go, and assemble. On sizes larger than $\frac{1}{2}$ " O.D. and where higher pressures are involved, end of tubing should be belled slightly.

Proved by Extensive Use in the Field . . . Used as standard equipment on trucks, tractors, diesel engines, oil filter connections, heavy power equipment, machinery, etc.

CATALOG No. 344-B

gives complete engineering data on Flex Fittings including types, sizes, dimensions, specifications and applications. Write for your copy.



REGLUS DRILLING TOOL saved The YORK PRECISION COMPANY, Inc. \$1500.00 in jigs and fixtures

"... on an order of 500 items of a certain type which required drilling jigs and fixtures estimated at a cost of \$1500.00, we found that all these drillings and spot facings could be made with the REGLUS as well."

"... we have new uses for the REGLUS every day and find it to be a highly practical and money saving device... in the future there will be one on every drill press."

... for exact drilling of round, flat, square or hexagonal work pieces.

By three simple manipulations, without applying wrenches or screw-drivers, the REGLUS tool is an individual, accurate special device of equal advantage whether applied in tool manufacture or in the duplicating of operations.

Work which ordinarily could be carried out only by highly skilled mechanics may now be executed on the REGLUS tool by regular operators.

Work sizes can be handled up to 1 3/4" diameter. Holes may be drilled up to 1/2" diameter.

Write today for further details on this NEW time and labor saving shop tool. Immediate shipment from stock in both metric and U.S. measurements.



PRECISION MACHINE SPECIALTY COMPANY

Exclusive Agents

1100 Morris Building, Philadelphia 2, Pa.

AN ALL TIME RECORD

FOR AN ALL STAR TEAM!

40.2% of All Carburetor Type Engines Built in 1947, 2 to 30 hp. Were WISCONSIN Heavy-Duty Air-Cooled ENGINES!

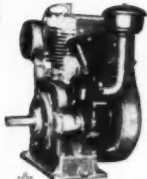
And here's the ALL STAR lineup... released in an official bulletin of the Bureau of Census, U. S. Dept., of Commerce, April 22, 1949.

In 1947, Wisconsin Motors built 51.7% of the engines in the 2 to 5 hp. range... in the 5 to 9 hp. range, 36.4%... 71.6% in the 15 to 22 hp. range... and in the 25 to 40 hp. range, 14.7%. Averaged together, 40.2% of the engines in the 2 to 30 hp. range were Wisconsin — excluding automotive, aircraft and out-board marine engines, and engines for use as original equipment by various manufacturers.

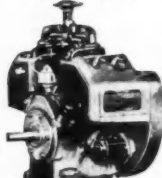
These figures sum up the confidence of equipment builders and users who are the final judges in choosing superior engines where it counts most... on the job delivering the goods.



Single cyl. 2 to 6 hp.



Single cyl. 6 to 9 hp.



V-type 4-cyl. 15 to 30 hp.



WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN

Metal Congress and Exposition

(Continued from page 29)

recognize outstanding metallurgical knowledge and exceptional ability in the diagnosis and solution of diversified metallurgical problems. The 1949 Medal for the Advancement of Research will be awarded to Fred H. Haggerson, president of Union Carbide and Carbon Corp., and one of industry's leading exponents of consistent research.

The Samuel Wylie Miller Memorial Medal for 1949 will be awarded by the American Welding Society to A. G. Bissel, principal engineer, Bureau of Ships, Navy Department, Washington, D. C. This award is made annually to the person judged most deserving for conspicuous contributions to the advancement of the welding or cutting of metals.

The Adams Lecture of AWS for 1949 will be presented by W. M. Wilson, professor of structural engineering, College of Engineering, University of Ill. This award is made annually to an outstanding scientist or engineer for major contributions to the welding field. Mr. Wilson's topic will be "The Advantages and Disadvantages of Electric Welding."

Publications Available

(Continued from page 54)

D-99 Research and Development Laboratories

Franklin Institute—An attractive brochure has been made available showing some of the investigations for which the Institute Laboratories are equipped and some of the capabilities. The brochure is well illustrated and contains complete explanatory text.

D-100 Rectifiers

Westinghouse Electric Co.—A new booklet gives information on standard and high-voltage selenium rectifiers for power supplies and electronic circuits. Included is a tabular presentation of schematic diagrams, formulas for calculating rectifier performance and cell ratings for a wide range of applications.

D-101 Rotary Gear Finisher Line

Michigan Tool Co.—Bulletin 873-49 describes a line of automatic crossed-axis rotary gear shavers designed for high production finishing of large gears. Progressive motion drawings show how the new Model 873 machines can be used to shave spur or helical gears. Included in the bulletin are table of general dimensions and operating specifications for the two machine sizes, lists of standard and special equipment available, etc.

How the base metal protects the finish

Progressive steps in the production of this emblem in red, white, blue, black and gold vitreous enamel and heavy gold plate, as made by American Emblem Company, Utica, N. Y.

(1) The metal is blanked from sheet stock. (2) First coining operation. (3) Second coining operation. (4) The excess metal is trimmed. (5) Attaching devices are welded. (6) First vitreous enamel charge has been fused by firing. (7) Second vitreous enamel charge has been fused by firing. (8) The enamel colors are stoned smooth. (9) Enamel has been given a final fusing and buffing. (10) The plate is electro gold plated.

(1A) The metal is blanked from sheet stock. (2A) The design is coined. (3A) The excess metal is trimmed and holes pierced. (4A) Attaching studs are welded. (5A) The plate is buffed and chrome plated. (11) The two pieces are assembled. (12) Finished plate as passed by inspectors.



This is a typical example of a fine emblem, combining good design, excellent materials, and a high degree of art and craftsmanship in production.

It is almost always the case, though unsuspected by the general public, that the material to which a finish is applied has a definite influence upon the perfection and durability of that finish. For example, products that are nickel or chromium plated stand up better if the base metal is non-rusting, as is copper and brass. To take another example, look at vitreous-enamelled emblems, used as trademarks, name plates, medals, lapel pins, insignia, and so on. Most of these emblems have a copper alloy as the base metal; only that, or gold or silver, can be used.

These emblems owe their beautiful

and permanent colors to silicate pastes and powders, inlaid by skilled artisans, and twice fused in a furnace at a temperature of about 1500° F. This temperature sets high standards for the underlying metal which must not warp, nor "bubble up" into the enamel. Thus visible beauty for which so much creative skill is required, depends in part on the invisible metal underneath. Revere, which takes great pains to maintain the strict standards of its alloys, is proud to meet the high requirements of American Emblem and other companies in this field . . . Perhaps Revere can help you by supplying exactly what you require to protect

the finish and durability of your product.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York

• • •

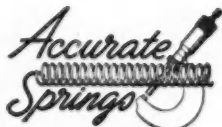
Mills; Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.

Sales Offices in Principal Cities, Distributors Everywhere.

First cost is only a part of the overall cost of your springs



Cost conscious spring buyers know that the first cost does not present the complete picture of spring costs. Uniformity, ease of assembly into your product, on-time delivery are just a few of the other factors that can affect the ultimate cost of your springs. In some cases a minor modification in design can cut costs without any loss of quality. We at Accurate are confident that our springmaking "know-how" and facilities can lower the overall cost of your springs. We have done this for many manufacturers and will be pleased to cite actual cases. Most of all we'd like to show you what we can do for you. Phone or write today for prompt attention.



COST CONSCIOUS QUALITY

Since 1930

ACCURATE SPRING MFG. CO.

3810 W. Lake St. • Chicago 24, Ill.
Springs, Wire Forms, Stampings

General News

(Continued from page 98)

Hudson Appoints C. A. J. Hadley Domestic Sales Manager

C. A. J. Hadley has been named domestic sales manager of the Hudson Motor Car Co. He succeeds Norman K. Van Derzee who was recently made vice president in charge of sales. Mr. Hadley has been associated with Hudson since 1935, and has had wide experience in the automobile retail field.

Yugoslavia to Buy Heavy Trucks in U. S.

A portion of the \$20 million Export-Import Bank loan to Yugoslavia is expected to be used for the purchase of heavy-duty motor trucks and trailers in the United States. Major portion of the loan will provide new mining machinery, but motor vehicles are also needed for the proposed expansion of mining activity.

Nash Estate Pays Tax of \$23½ Million

The estate of the late Charles W. Nash, pioneer automobile manufacturer, has just paid a federal tax of \$23½ million. Executors said that the estate is still subject to the California inheritance tax and other levies which will eat up about 75 per cent of the total, \$43,183,000.

North American Drops 600 Employees

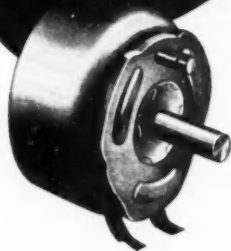
North American Aviation, Inc., has dropped 600 production and tooling employees. According to the announcement, the company has been holding the employees in anticipation of more government contracts, but "because of the delay in the awards of these anticipated contracts, it is impossible to spread this work further."

Certify Alloy Quality of Zinc Die Castings

The Certified Zinc Alloy Plan, a new project of the American Die Casting Institute, is of interest to all buyers and ultimate users of zinc die castings. Producers subscribing to this plan may now identify all their zinc die castings with a certification seal. This is a mark of assured quality identifying member producers and serving to assure the die casting purchaser of buying die castings produced from proper zinc alloys and with adequate processing controls.

(Turn to page 106, please)

LEDEX ROTARY SOLENOID



SOLVES MANY REMOTE CONTROL PROBLEMS

The many production applications of Leduc Rotary Solenoids vary from the dependable, snap-action tripping of airborne bomb releases to the actuation of rugged, hydraulic valves in heavy duty materials handling equipment.

Five Leduc Rotary Solenoid models are manufactured. Diameters range from 1½ to 3½ inches. Predetermined rotation up to 95° can be engineered to suit your product's requirements. Starting torques for 45° stroke range from ¼ pound-inches to 50 pound-inches.

We supply to quantity users and solicit the opportunity to be of assistance in engineering a Leduc Rotary Solenoid to meet your product's requirements.

MODEL NO.	2	5	6	7	8
Diameter	1½"	1¾"	2¼"	2½"	3½"
Torque lb./inches	¼	5	10	25	50
Weight lbs.	½	½	1	2¼	4½

Magnetic action moves the armature along the solenoid axis. This action is converted into a rotary motion by means of ball bearings on inclined races.



WRITE
DIRECT TO

G. H. Leland INC.

159 WEBSTER STREET

DAYTON 2, OHIO



AT "DOUBLE DIAMOND"...AS ON THE BASEBALL DIAMOND—



You Can't Cut the Corners that Count!

Here in Richmond, Indiana, we're doing just as you are doing. We're trying to cut corners, reduce costs, produce more good gears for less.

But in gear making, as in baseball, cutting some corners is "out." We won't stay in business making low cost gears that produce high cost trouble on the job.

We can't and won't cut the corners that shorten the quality of

"Double Diamond" Gears. We believe you want it that way. We believe you want gears that do credit to the product in which you install them. We believe you want gears that give you the best, and in the long run, the biggest economy—the economy of a low installation cost, plus the economy of service-free performance. We believe you want, in this increasingly competitive market, the kind of

gears that help you create a sound product that sells, that serves, that satisfies.

"Double Diamonds" are made to measure up to those beliefs and are always delivered to you with the honest conviction that—everything considered—you could make no better buy in gears.

Your inquiries will receive prompt attention—by mail or personal visit, as you prefer.



Made by
Automotive Gear Works, Inc.
RICHMOND, INDIANA

..... FOR AUTOMOTIVE

FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS

*Reg. U.S. Pat. Off.



HYPOID BEVEL



SPIRAL BEVEL



FLYWHEEL GEAR



ZEROL[®] BEVEL



STRAIGHT BEVEL



STRAIGHT SPUR



HELICAL SPUR



SPLINED STEM PINION



SPLINE SHAFT



◀ Hycar Packing Unit

Packing unit molded from Hycar by Kirkhill Rubber Co., Los Angeles, California

Swivel joints made by Chiksan Co., Brea, California

How to twist a pipe, yet keep it leak-proof

TRANSFERRING liquified petroleum gas from tank cars to ships used to be a tough job. Discharge pipes couldn't be twisted or turned to hit the right spot, at just the right angle.

But an easy way to do the job was found after two tricky problems were licked. One problem went by the boards when the Chiksan Ball Bearing Swivel Joint was developed. This unique joint makes it possible to twist and turn pipe to just about any angle. The other problem—leak-proofing the joint—was solved with a packing unit made with Hycar American rubber.

The Hycar Packing Unit, a flexible seal between the metal parts,

exhibits minimum volume change under service conditions. It effectively stops leakage of gas or liquid flowing from one section to another. Swivel joints are used successfully wherever gases or liquids are transferred or transported—such as refineries, chemical plants, dairies, food processing plants, bottling works and canneries.

Hycar was chosen for the leak-

Hycar
Reg. U. S. Pat. Off.
American Rubber

proofing job because it has such a wide range of qualities. It is resistant to oil and gas, abrasion, and does not flow even under extreme pressures. Hycar compounds can be varied from extremely soft to bone hard, and made in many colors.

Hycar may be just what you're looking for to answer a problem . . . to make better, more saleable products. For Hycar is used as a base material . . . as a plasticizer for vinyl resins . . . as a modifier for phenolics . . . as an adhesive base . . . as a latex for coating or impregnating. Send for complete information. Just write Dept. HC-10, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

B. F. Goodrich Chemical Company

A DIVISION OF
THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers

Metals in Automobiles

(Continued from page 31)

ings in the water pump, generator, distributor, windshield wiper, steering gear, transmission and other units.

Terne plate is another lead product utilized in the automobile. It is an alloy made up largely of lead with 15 to 20 per cent tin and is used as a protective coating on sheet steel, particularly where the steel is subject to severe corrosion conditions. The steel is coated with the lead alloy by a "hot dipping" process, whereby the thoroughly cleaned steel is dipped into a bath of the molten alloy permitting (with the help of a flux) a thin coating of the alloy to adhere to the steel. The resulting product, known in the trade as terne plate is used to make automobile gas tanks. Other applications found in the car are oil filters, oil and air cleaners and radiator side supports. Pure lead is sometimes electroplated on steel for use around the battery where the lead layer serves to protect the steel from corrosion by the sulfuric acid electrolyte in the battery. Lead is noted for its ability to resist the attack of sulfuric acid.

Other properties of lead occasion its use in such applications as sealing with soft ductile lead shot some of the holes which must be drilled through carburetor bowls. The high density of

lead is used to advantage in balancing car wheels. Small quantities of lead are cast onto steel lugs which are fastened to the inside rim of the wheel in order to compensate for unevenness of weight distribution.

All of the uses for lead in an automobile are not so obvious as the above. There are other applications wherein lead loses its identity entirely. For example, note its use as an alloying constituent in the leaded brasses (red and yellow). These alloys containing from 3 to 6 per cent lead are used for water pump fittings, valve bodies, radiator parts, fittings for water cooling systems as well as miscellaneous screw machine applications such as meter and clock parts. The lead is added to these brasses so as to provide easy machineability.

Lead in the form of compounds such as litharge (lead oxide) is used as a minor constituent of hard rubber and electrical wire insulating material and occasionally in the rubber used for the tires.

Still another use for lead very vital to the automobile but not to be found on the production line is in the form of tetraethyl lead. The average motor vehicle in this country consumed between 2 and 3 lb of metallic lead in this form last year. This accounts for the fact that the gasoline industry is the fourth largest consumer of lead in the country.

FOR BUS, TRUCK, AND TRACTOR APPLICATIONS

GENERAL CONTROLS

hi-g* VALVES



Normally closed shut-off valve of the electro-magnetic type—various magnet sizes—full ported or restricted parts—for all types of fluid, gasoline, air, water, oils, etc.



Pilot Piston valve for medium and high pressure applications. Normally open and normally closed types. Controls hydraulic oils, fuels, lubricating oils, water, etc. 50 to 3000 P.S.I. operating pressure.



Electric motor valve, suitable for fuel, hydraulic fluid and lubricating oil shut-off. High flows at low pressure drop, explosion-proof motor and switch cover.



Three-way Electro-Magnetic valve used for distribution of fluid flow or for "feed in" and "exhausting" fluid from a cylinder, piston or vessel.



Four-way selector type control-operating pressure up to 3000 P.S.I. for control of fluid pressure operated cylinders.



Same as PV-1 except is normally open type. For control of various fluids, oil, water, gasoline, air, etc.



GENERAL CONTROLS

Manufacturers of Automatic Pressure, Temperature and Flow Controls.

FACTORY BRANCHES: Birmingham (2), Boston (10), Chicago (5), Cincinnati (2), Cleveland (15), Dallas (2), Denver (10), Detroit (8), Glendale (1), Houston (6), Kansas City (2), New York (17), Philadelphia (40), Pittsburgh (22), Seattle (1), San Francisco (7), St. Louis (12), Tulsa (6). DISTRIBUTORS IN PRINCIPAL CITIES.

CONSTANT POWER ZONE



DIAMOND G SPRING LOCK WASHERS

Assure Longer Lasting Assemblies

The life of the assembly is usually determined by the length of the Power Zone of the fastening device. Diamond G Spring Lock Washers have been designed, developed and torture-tested to provide the maximum Constant Power Zone . . . longer positive holding power.

WASHER FOR EVERY NEED

Whatever your needs in spring lock washers, there's a Diamond G to answer it—high carbon steel, bronze, aluminum, stainless steel and monel metal spring lock washers finished or plated with cadmium, nickel, brass, copper or other finishes . . . plus the new Diamond G Aluminum Spring Lock Washer that combines lightness of aluminum with the strength and durability of steel.

Garrett also manufactures a complete line of flat washers, spring washers, springs, stampings, hose clamps, snap and retainer rings.



Write for your free copy of the technical booklet "Small Parts For Better Production."

DIAMOND G PRODUCTS

Manufactured by
GEORGE K. GARRETT CO., INC.
Philadelphia, Pa.

GARRETT

MANUFACTURERS
OF SMALL PARTS

AUTOMOTIVE
INDUSTRIES
Goes into
Leading
Plants in the
Automotive
and Aircraft
Industries

Give your key men the up-to-the-minute facts on . . .

RESISTANCE WELDING

New fact program helps
cut costs in your plant

Up-to-date knowledge of modern resistance welding is a *must* for your key men. Get this money saving information to them *now*!

IT'S EASY—General Electric has prepared all the facts in an easy-to-take, visual manner that's ideal for getting new ideas across fast.

Here's what the resistance welding program offers:

1. A fact-packed manual detailing the methods, practices, and equipment of modern resistance welding. It spells out objectively—without sales bias—the many ways in which this versatile industrial tool cuts costs and increases speed.

2. A full-color, sound motion picture, running about a half hour, showing how resistance welding solves problems similar to yours.

3. Fully-illustrated highlights booklets for individual study and review.

Convince yourself first—

We want you to judge for yourself whether the resistance welding program will pay off in your plant. That's why we offer business executives this chance to examine the *Resistance Welding Manual* without cost.

Showings cost you nothing. With your manual, we'll tell you how to arrange for a FREE film showing.



**FREE
TO BUSINESS
MANAGEMENT**

Attach
to your
business
letterhead

General Electric Co.
Section H684-3
Schenectady 5, N. Y.

Please send me a sample copy of the G-E Resistance Welding Manual without cost or obligation, with details on how I can arrange for a FREE SHOWING of the film. (Extra copies at regular manual price—\$1.00.)

Name _____ Title _____
Company _____
Street _____
City _____

GENERAL ELECTRIC

General News

(Continued from page 102)

Tinnerman Products Plans New Cleveland Plant

Tinnerman Products Inc., manufacturers of fasteners, will build a new \$1.5 million plant at Cleveland. Demand for the company's products has made expansion of facilities necessary, according to George A. Tinnerman, vice president.

Canadian Car Shipments Dipped in July

Factory shipments of Canadian-manufactured motor vehicles dropped 16 per cent during July, the Bureau of Statistics recently reported. The figure was 68 per cent above the corresponding figure last year. During the first seven months of this year shipments climbed 15 per cent, compared with the same period last year.

Japan Has 16 Automobile Companies

Japan now has 16 companies manufacturing automotive vehicles accord-

ing to the Commerce Dept. Most of the truck and small-car manufacturing is concentrated in three large companies. Less than two decades ago no motor cars whatever were made in Japan.

Penn-Ohio Steel Buys Van Auken, Inc.

Penn-Ohio Steel Corp., Birdsboro, Pa., has purchased Van Auken, Inc., manufacturers of automobile grille guards. The Van Auken plants at Ferndale and Mount Clemens, Mich., will be operated by Penn-Ohio as a subsidiary.

Purolator Releases New Training Film

Designed to show dealers and station attendants the need for periodic filter-checks whenever they get under the hood or change oil in a car, *Pay Dirt*, a new Purolator Products, Inc., sales training film, is now being released for use in the field.

Studebaker Pacific Plant On Six-Day Schedule

Production at Studebaker Pacific Corp.'s Vernon (Los Angeles) plant has gone on a six-day schedule for the first time in the plant's 13-year history.

"What's so good about H-VW-M polishing wheels?"

I like customers to ask frank questions. This fellow wanted facts, and no fooling. Of course, handling H-VW-M's line of electroplating and polishing equipment gives a guy plenty to talk about, so I got down to brass tacks.

"Show me any polishing job you have, and I'll show you an H-VW-M wheel that will do it better and save you money to boot," I offered.

"Big talk," you say? Well hold on a minute, we can back that up. H-VW-M has put a lot of years into testing and developing its line of polishing equipment, and 'by George' they know wheels inside out. They know whether cotton, canvas, leather or felt is best for the job; know how to cut, sew and glue the fabrics to withstand crushing and tearing strains incident to sharp, high-speed polishing; know how to provide sufficient flexibility, uniform density and proper balance so essential to maximum efficiency and long wear.

"But," I went on, "the important thing is that H-VW-M applies this knowledge to each wheel it turns out. That means when you specify H-VW-M polishing wheels, you're sure of getting the right wheel for your job every time."

"Tell you what," I concluded, "let's take a look at some of your polishing problems right now. We find that first hand analysis usually pays off in big savings to customers—and that's a service that is available to you anytime."

Ask your H-VW-M representative to help you solve your polishing problems, or write to "Headquarters" for a copy of Bulletin W-102. It describes our complete line of polishing wheels and accessory products.



JOHN D. KERSHAW
Field Representative
H-VW-M Grand Rapids
Michigan Office



HANSON-VAN WINKLE-MUNNING COMPANY MATAWAN, NEW JERSEY

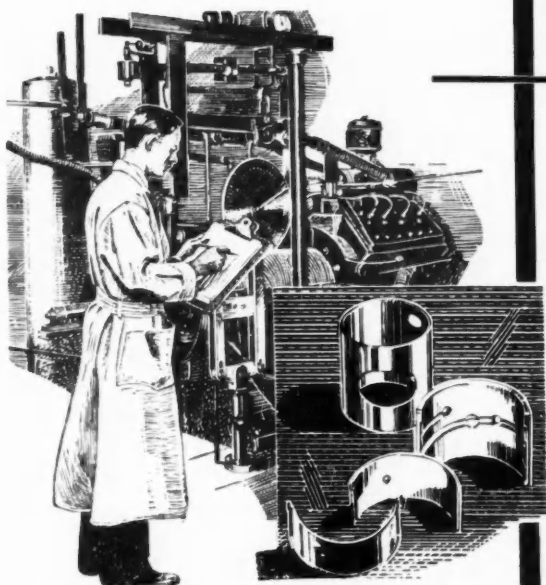
Manufacturers of
a complete line of electroplating and polishing equipment and supplies
Plants: Matawan, New Jersey • Anderson, Indiana
Sales Offices: Anderson • Chicago • Cleveland • Dayton • Detroit
Grand Rapids • Houston • Milwaukee • New Haven • New York • Philadelphia
Pittsburgh • Rochester • Springfield (Mass.) • Stratford (Conn.) • Utica

Hanson-Van Winkle-Munning has supplied the plating industry for over 70 years. Our sales-engineers are thoroughly familiar with every step in the process of electroplating and polishing. It is this overall knowledge that has made H-VW-M "Headquarters" for electroplating and polishing equipment, supplies and technical assistance.



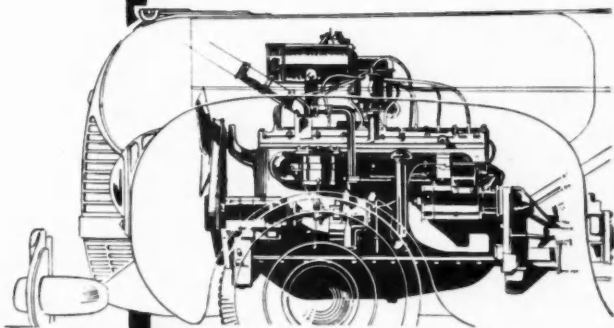
JOHNSON BRONZE ENGINEERING SERVICE

*can be
helpful*



THE designing of sleeve bearings is a specialized branch of engineering. Johnson engineers combine the know-how acquired over years of specialization with the study of specific requirements. Material properties, lubricants, hydrodynamics, load, speed, temperatures, and other considerations are carefully studied. Consultation with these Johnson Bronze specialists has proved invaluable to many automotive and other manufacturers. Write, wire or call for an appointment.

You will find Johnson Engineers willing to help you decide which type bearing is best suited and to design it for the application. As we manufacture all types of sleeve bearings, we base all of our recommendations on facts, free from prejudice.



Johnson Bronze
SLEEVE BEARING HEADQUARTERS
625 SOUTH MILL STREET • NEW CASTLE, PA.

PROVING GROUNDS for MIDLAND POWER BRAKES

Factory Owned and Operated Fleet of 24 BIG HEAVILY LOADED TRACTOR TRAILERS

This factory owned and operated fleet of heavily loaded tractor trailer units is equipped with both experimental and standard Midland Air and Vacuum Power Brake Equipment. Negotiating the heavy Detroit street traffic, 24 hours a day, in all weather conditions, is a severe test in itself. These tests are conducted month in and month out under the watchful eyes of Midland engineers. Laboratory tests are substantiated through this always available fleet operation.

See your nearest Midland Distributor, or contact us for complete information about Midland Power Brakes.

THE MIDLAND STEEL PRODUCTS CO.

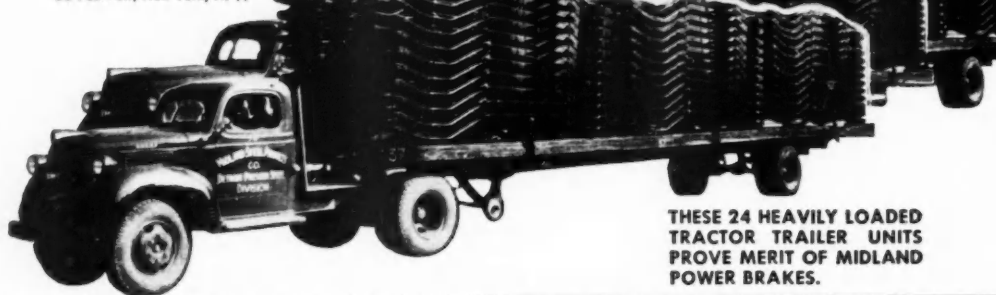
6660 Mt. Elliott Avenue • Detroit 11, Mich.

BRANCHES

1367 So. Flower St., Los Angeles.
601 S. E. Clay St., Portland, Ore.

EXPORT DEPARTMENT

38 Pearl St., New York, N. Y.



THESE 24 HEAVILY LOADED
TRACTOR TRAILER UNITS
PROVE MERIT OF MIDLAND
POWER BRAKES.

MIDLAND



POWER
BRAKES



AUTOMOBILE
AND TRUCK FRAMES



BUS DOOR
CONTROLS



"There Must be Something Wrong Here, Boys"



And There Is if someone hasn't found the way to **CUT HANDLING COSTS IN HALF!**

Did it ever occur to you, with prices under pressure, sales declining, profits being squeezed, that your order to "Lay low on capital expenditures" actually has helped sky-rocket your costs?

Do you know that many large concerns have hit on almost a magic formula that gives quick relief from the headaches of rising costs? They found a way to **CUT HANDLING COSTS IN HALF.** That way, is the Automatic Electric Truck way.

These amazing electric trucks lift, move and stack your material ceiling-high with easy, finger-tip operation . . . hundreds of pounds, or tons. One operator handles more material than three workers could by antiquated manual handling methods, releasing two men for more productive work.

So, when your cost figures call for a showdown, instead of saying: "There must be something wrong here, boys", consider *how much* Automatic's 50% saving in handling costs could change your top-heavy costs picture.

And has it ever occurred to you, that your competitor can *undersell* you because he enjoys a large saving using Automatic Electric Trucks? Saleswise, for every \$5,000.00 saved in cutting handling costs, you earn the equivalent of a 5% profit on \$100,000.00 worth of sales!

Mail the coupon for all the facts . . . and then you'll see why Automatic equipment is *not* a capital expenditure, but a money-making, cost-cutting *bonus*, every time you handle material!

Automatic
ELECTRIC TRUCKS

Lighten
LIFE'S LOADS

Transporter
A PRODUCT OF AUTOMATIC

Lighten
LIFE'S LOADS

Trade Automatic Mark

57 W. 87th St., Dept. T-9, Chicago 20, Illinois

Please send me complete money-saving facts on amazing Automatic Electric Trucks without obligation.

Company name.....

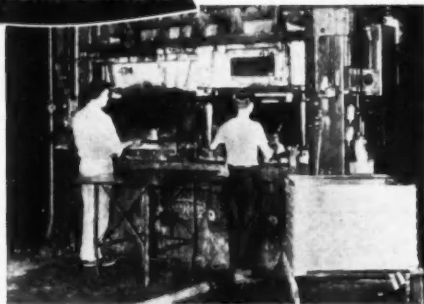
By..... Position.....

Street Address.....

City..... Zone..... State.....

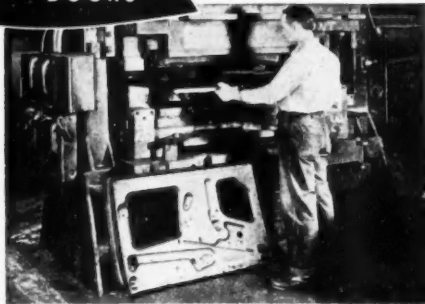
CLEVELANDS... common denominator of low cost diversified metal forming

REFRIGERATORS



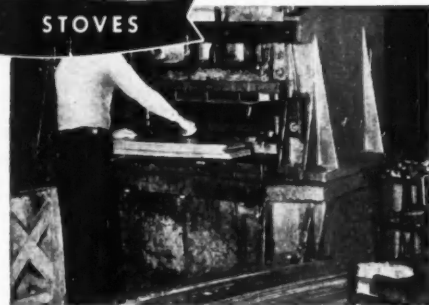
Top appliance producer mass produces accurate parts on Cleveland Presses.

DOORS



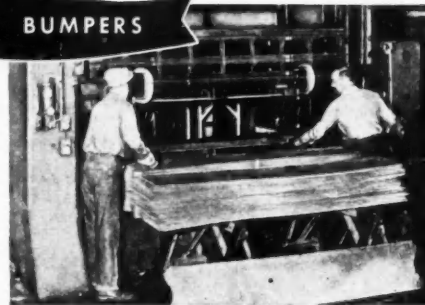
High speed production of automotive parts is required in this modern plant.

STOVES



Prominent stove manufacturer has used Cleveland for years.

BUMPERS



Leading producer of auto bumpers utilizes Cleveland Presses.

Not only for doors, stoves, refrigerators and bumpers but for all the diversified manufacturing in the metal forming industry, Modern Cleveland Presses are known for their compact design and extreme ruggedness. *Longer die life, minimum maintenance and constant accuracy* are your assurance of lower production costs with Cleveland.

If you have a problem which involves the use of Power Presses, our engineers, by reason of their wide and varied experience, are thoroughly qualified to make practical recommendations as

to type of Presses most suitable for your requirements. They are confronted daily with new problems and from their knowledge of what has been done through the use of Power Presses they have been able to solve various problems to the entire satisfaction of manufacturers throughout the country who have availed themselves of the opportunity to use this Cleveland service.

If you are not already acquainted with the many production advantages offered by Modern Cleveland Presses write for our bulletin 10-5.

A-5015

PUNCHING TOOLS & DIES

OFFICES AT:
NEW YORK...CHICAGO
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THE CLEVELAND
PUNCH & SHEAR WORKS CO.
U.S.A.

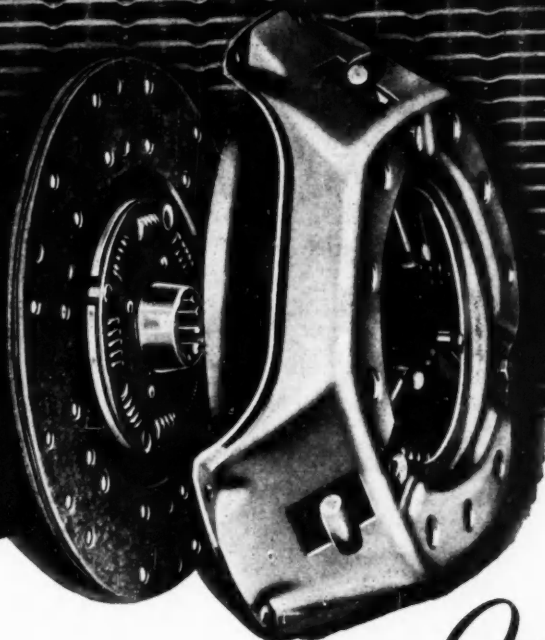
Established 1880

..... POWER PRESSES

FABRICATING TOOLS

CLEVELAND 14, OHIO

A PRODUCT OF
BORG-WARNER



Uniform Quality

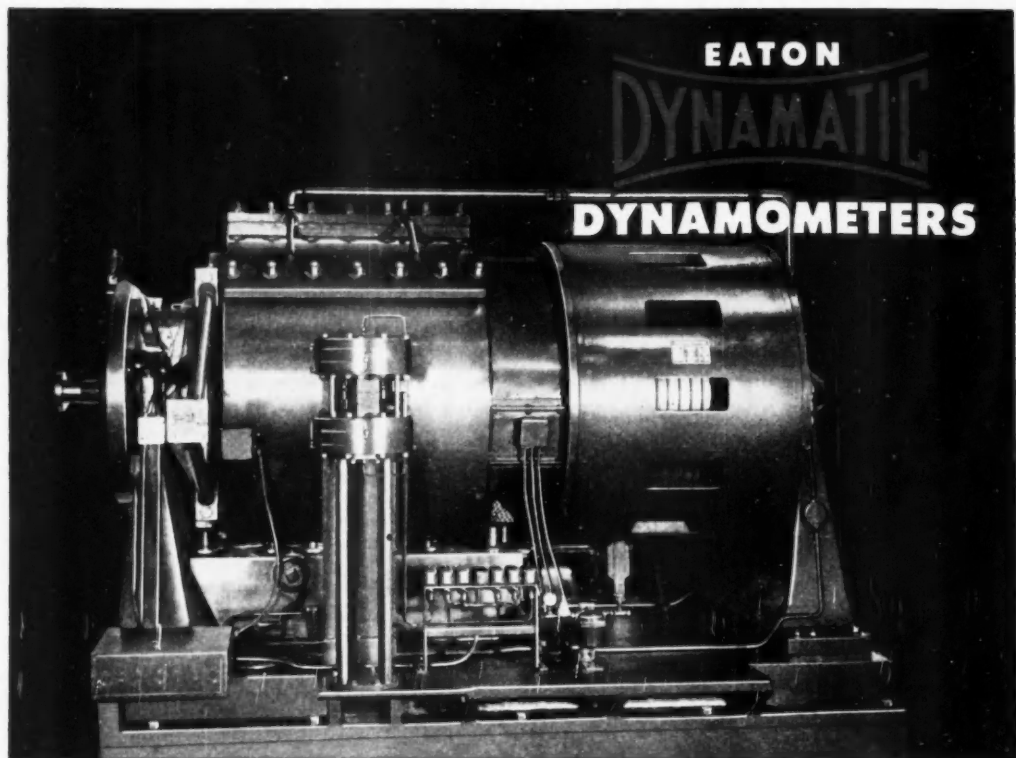
For uniform performance, such vital automotive assemblies as clutch and radiator require rigid controls in production. Plant capacity is important . . . manufacturing experience, too.

Long has produced radiators since 1903, clutches since 1922—supplying leading automotive manufacturers. Millions of Long-equipped cars, trucks, buses and tractors are performing efficiently—on the road and in the field—today.

LONG MANUFACTURING DIVISION
BORG-WARNER CORPORATION
DETROIT 12, and WINDSOR, ONTARIO

LONG

CLUTCHES • RADIATORS • OIL COOLERS



Accurate Vibration-Free Readings at All Speeds

Dynamatic Dynamometers are characterized by extreme smoothness and freedom from vibration, providing quick, accurate readings at all speeds. Convenient, positive control is accomplished with simple, inexpensive, electronic equipment. These units are extremely flexible in operation, and are adaptable to a wide range of conditions, producing very high torques at low speeds, operating easily at high speeds, and offering a smooth and infinitely adjustable range of torque. An important feature is completely self-contained A.C. operation.

Dynamatic Dynamometers are extremely simple, compact, light in weight, and moderate in cost. They are available in absorbing, motoring, and universal types. The latter provide for instantaneous switching from absorbing to motoring and back, so that friction horsepower of an engine can be determined at attained operating temperatures.

There are almost unlimited possibilities in horsepower and speed combinations; horsepowers from 5 to 5000; speeds from 100 rpm to 30,000 rpm.

Write for illustrated literature and technical data.

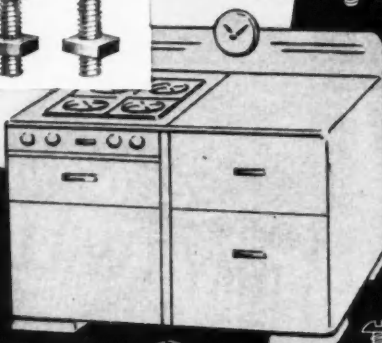
EATON MANUFACTURING COMPANY • CLEVELAND, OHIO
ADDRESS INQUIRIES TO: DYNAMATIC DIVISION • KENOSHA, WISCONSIN



PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRINGTITES • SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS



from **ELECTRIC TOASTERS**
to **STOVES and RANGES**



"Make it Fast"
WITH **CENTRAL** FASTENERS

From the tiny truss head screws in your electric toaster, to the larger stove bolts in cooking ranges—Central Screw Company is one of the nation's leading producers both quantity-wise and quality-wise. **TWO HIGH-SPEED PLANTS**, one east and one midwest, enable Central to deliver all types of standard and special fasteners to any destination . . . fast!

Fast **DELIVERIES...**

FROM CENTRAL'S **2** BIG PLANTS



A TWO-PLANT ORGANIZATION FOR QUICK NATION-WIDE SERVICE



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CENTRAL **CENTRAL SCREW COMPANY**
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**"RIGHT" ON THE JOB
WITH DR. PEPPER**



Dr. Pepper

SMART-LOOKING employees reflect a smart organization. That's why the purchasing agents for Dr. Pepper choose uniforms of durable Reeves Army Twill.

Made only from carefully selected, highest quality cotton, Reeves Army Twill is Sanforized and vat-dyed in colors which are fast to sun, water and perspiration. It endures the hardest wear . . . the toughest treatment of repeated washings, and still looks fresh and crisp.

Make sure your workers look trim and smartly dressed all through the day. Join the thousands of organizations from coast to coast, who know that their employees look better . . . work better . . . and feel better in uniforms made of long-lasting Reeves Army Twill.

"FROM COTTON TO CUTTER"

Uniform illustrated manufactured by
T. S. Lankford & Sons, Abilene, Texas

REEVES BROTHERS, Inc. 54 WORTH STREET, NEW YORK 13, N. Y.

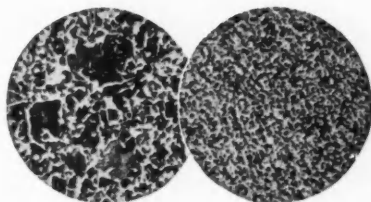
REPRESENTATIVES IN: Akron • Atlanta • Boston • Chicago • Dallas • Los Angeles • Philadelphia • Portland, Oregon • St. Louis • Montreal • Toronto

YOU CAN DEPEND ON

VANADIUM

to give you grain size control, high performance, and ease of processing

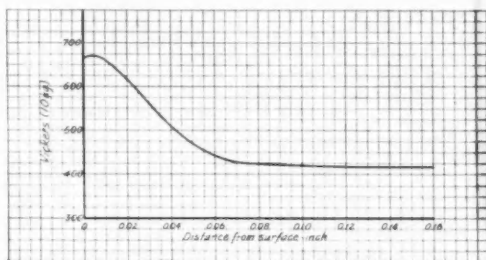
GRAIN SIZE is refined by the addition of vanadium, the balance between strength and toughness is improved, and greater uniformity is promoted between transverse and longitudinal properties.



0.34 C

0.34 C, 0.20 V

HIGH PERFORMANCE follows the use of vanadium in constructional steels. In carburized parts, for example, the well-integrated bonding between case and core, inherent in vanadium carburizing steels, assures excellent shock-resisting properties and maximum service life.



Hardness penetration graph of Chromium-Vanadium A 6120 steel, with a light case 0.80-0.85% carbon in outer .010 inch

EASE OF PROCESSING—Uniformity of vanadium steels from heat to heat, with easy and uniform response to thermal and mechanical treatments, brings large compensation—savings far over-shadowing differences in initial materials costs.

Our metallurgists will be glad to assist you in the application of vanadium to meet your requirements.



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FERRO-ALLOYS

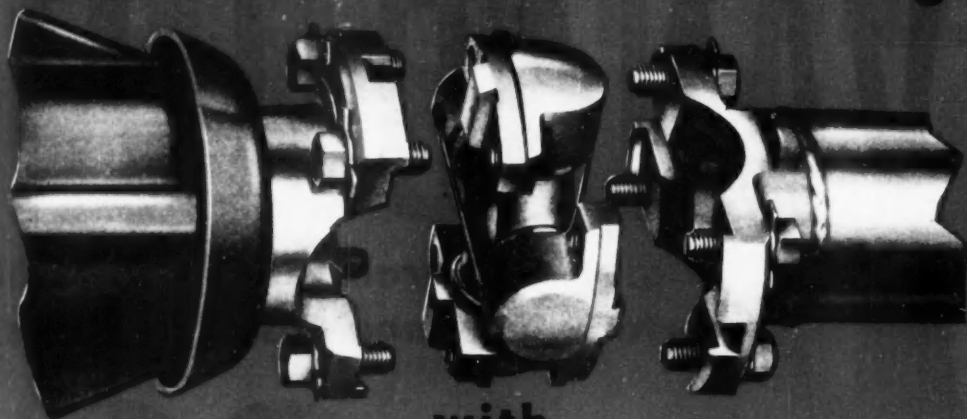


CHEMICALS
AND METALS

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

Reduce DOWN-TIME for Servicing



with

MECHANICS

Roller Bearing

UNIVERSAL JOINTS

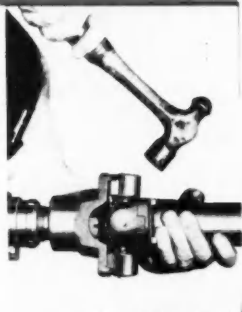
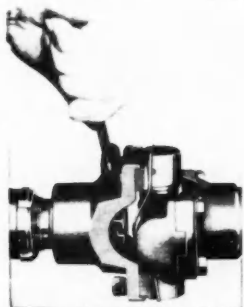
For Cars • Trucks • Busses • Tractors • Industrial Equipment

Fifteen Minute Servicing

Car and truck manufacturers recommend that universal joints be removed, cleaned, relubricated and replaced at regular, specified intervals. The down-time required for this operation can be reduced from hours to 15 minutes — by equipping your car or truck with MECHANICS Roller Bearing UNIVERSAL JOINTS. The flange-type bearing assembly can be lifted out, simply by removing the screw bolts. Because keys and keyways are ground to fit there is no danger of destroying the original accurate alignment and balance. Let our engineers show you how this and other exclusive features of MECHANICS Roller Bearing UNIVERSAL JOINTS will give your car or truck competitive advantages.

—with a
wrench

to turn down the lock plates and remove the bolts — and to tighten and lock them again.



—and a
hammer

to tap the tops of the bearings lightly, to release them — and to compress the cork packing between the bearings and trunnions when the joint is re-assembled.

MECHANICS UNIVERSAL JOINT DIVISION

Borg-Warner • 2024 Harrison Ave., Rockford, Ill.

BIG

30 ton (15'4" high x 6'8" wide x 12'5" deep)

ADJUSTABLE

36" round head, joint driven type

UNIVERSAL

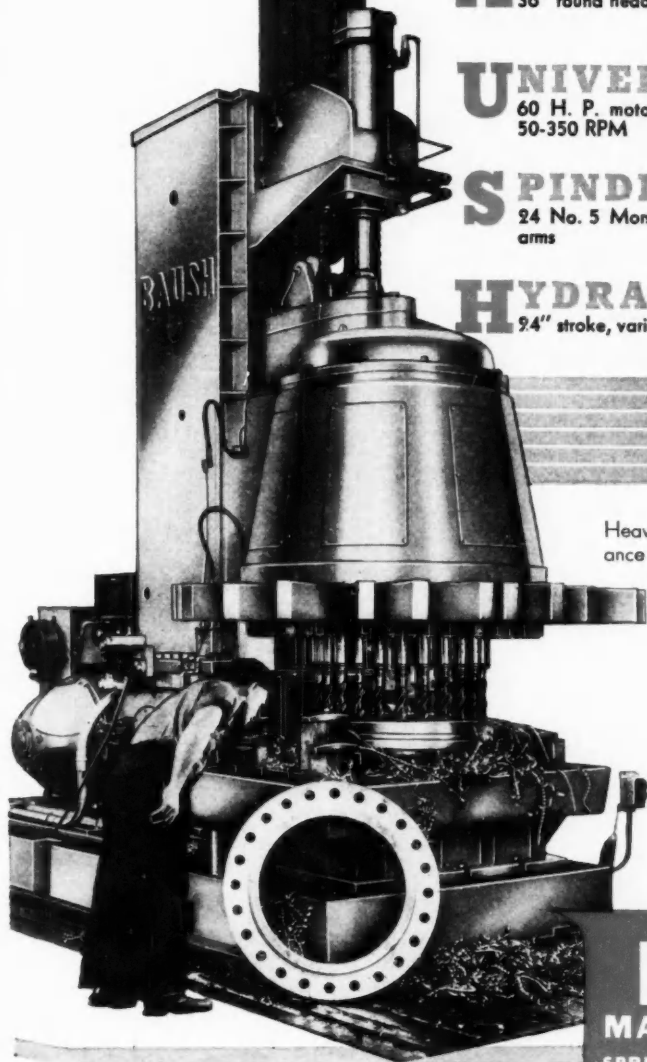
60 H. P. motor, spindle speed range 50-350 RPM

SPINDLE

24 No. 5 Morse taper and adjustable arms

HYDRAULIC

24" stroke, variable feed rates



Heavy-duty drilling, with production performance at maximum efficiency, is the result of typical Baush engineering design and rugged construction in this "Super Capacity" Vertical Center Feed Type Hydraulic Multi-Spindle Drilling Machine.

Machine illustrated has 60 H. P. constant drilling capacity.

Consult Baush for solutions to your drilling, reaming, boring or tapping problems.

B
BAUSH
MACHINE TOOL CO.
SPRINGFIELD 7, MASSACHUSETTS



FOREMOST IN SCIENTIFIC DEVELOPMENT

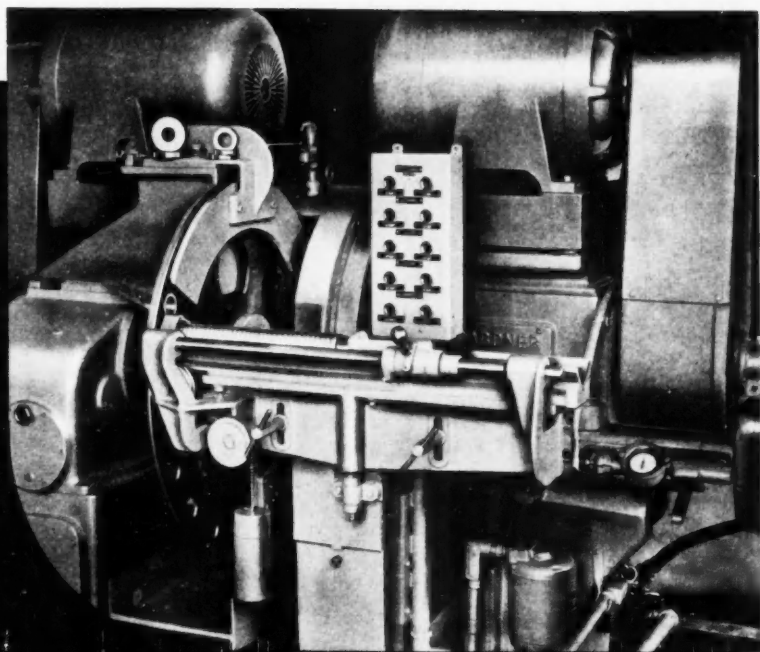
IN THE REALM OF FORGING
DESIGN AND THE DEVELOPMENT
OF PROPER GRAIN-FLOW, WYMAN-
GORDON HAS ORIGINATED MANY
FORGING DESIGNS, WHICH AT
THE TIME OF THEIR DEVELOPMENT
WERE CONSIDERED IMPOSSIBLE
TO PRODUCE BY FORGING.

WYMAN-GORDON

ESTABLISHED 1888

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL
WORCESTER, MASSACHUSETTS
HARVEY, ILLINOIS DETROIT, MICHIGAN

Improve
the CUT
—and
CUT the
COSTS—
with



GARDNER *Double* GRINDERS!

As competition becomes keener, quality and costs become increasingly important. With many types of parallel-surfacing operations, GARDNER *Double GRINDING* both improves the accuracy of the cut, and cuts the cost of production.

WORK DATA

Part *Bear Blanks*
Material *Steel*
Operation *Grind Two Sides*
Tolerances *.001" for*
Parallelism and Uniformity
Stock Removal *.015" Maximum*
(Roughing Cut); .001" to .002"
Maximum (Finishing Cut)
Production *18 to 20 Pieces*
Per Minute, Per Cut.
Feed *Hand Load to Trough-*
type Feed Attachment;
Automatic Unload
Machine *#125-26"*
Gardner Double Grinder

As in the example shown above, specially adapted, semi-automatic fixtures keep the parts moving between two opposed grinding wheels, where TWO sides are ground with ONE pass through the machine.

SPEND Money to SAVE Money!

You can help make more sales — and more profits — by investing in quality-improving, cost-cutting GARDNER *Double GRINDERS*.



Use Modern
GARDNER
WIRE-LOK
Abrasives
on YOUR
Disc Grinders!

GARDNER - GRIND
YOUR Flat SURFACES

Write for Latest Bulletin on Gardner DOUBLE Grinding!

GARDNER MACHINE COMPANY

444 East Gardner Street • • • • Beloit, Wisconsin, U.S.A.

**It's not the container size
that counts...**

*it's the
filtering surface!*

**That's why the
accordion element
in Purolator's
Micronic Oil
Filter removes
290% more
abrasives...**

PERCENTAGES BY WHICH PUROLATOR
MICRONIC ELEMENT EXCELLED
COMPETITIVE TYPES

COMPETITOR	IN AVERAGE OILY RESIDUUM PUROLATOR LBD 871
A	199%
B	220%
C	113%
D	547%
E	164%
F	619%
G	255%
H	339%
I	318%
J	193%
K	237%

AVERAGE PUROLATOR SUPERIORITY
290%

Just look! This smallest automotive-type Purolator Micronic element has 570 square inches of effective filtering surface compared to 54 square inches in ordinary filters! Yet it's no larger in container size.

Purolator engineers perfected this element so that it filters particles measured in microns (.000039 of an inch) . . . removes an average of 290% more abrasives as proved by competitive test results shown above.

These Purolator advantages add up to *faster*, more *complete* filtering of *all* the sludge and abrasives . . . longer engine life with fewer repairs . . . greater acceptance for your engines and vehicles equipped with Purolator. Greater acceptance because car owners everywhere learn about Purolator through the most aggressive advertising campaign in the oil filter industry!

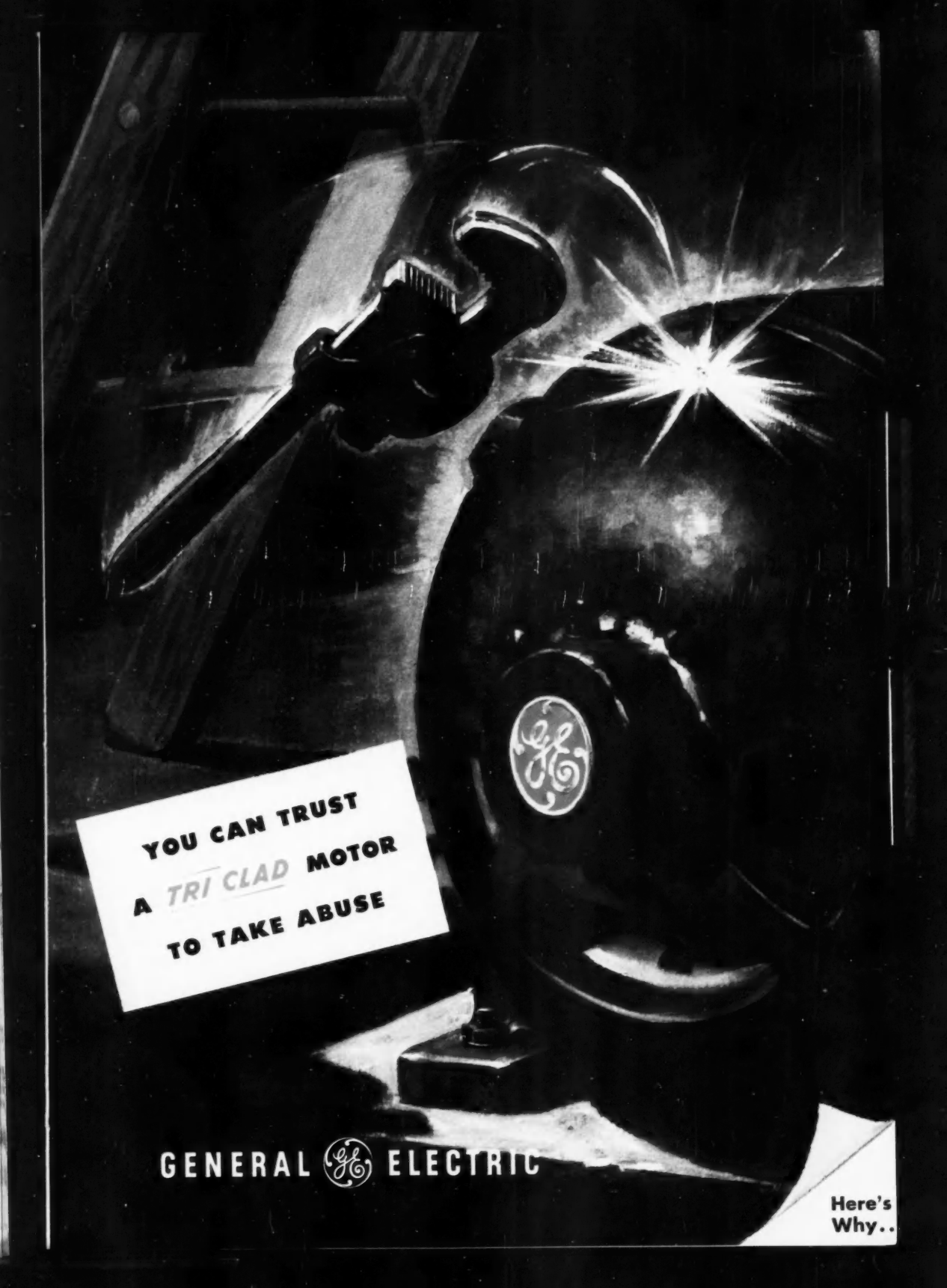
If you have a *special* filtering problem, let our technical staff lend a hand. They're the most experienced filter engineers in the business!



PUROLATOR PRODUCTS INC.

Newark 2, New Jersey; and Windsor, Ontario, Canada

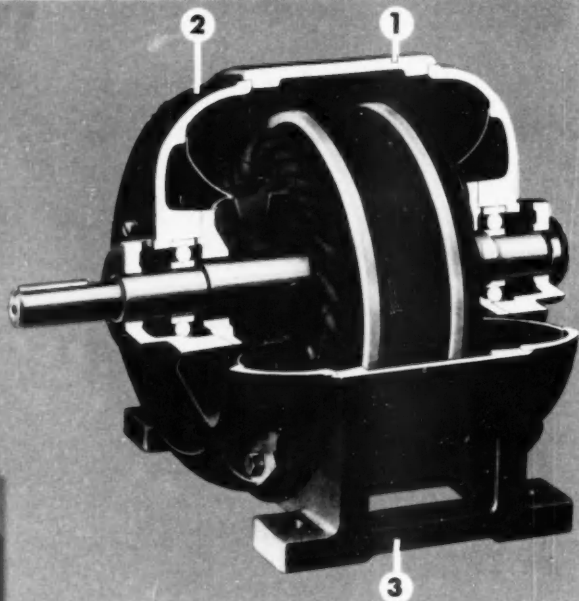




**YOU CAN TRUST
A *TRI CLAD* MOTOR
TO TAKE ABUSE**

GENERAL  ELECTRIC

**Here's
Why..**



Notice the thick cross sections of a Tri-Clad's husky cast-iron stator frame (1) and end shields (2) ... the integrally cast feet (3). Here you have a rigid structural unity that no other general purpose motor we've seen can match. Distortion of bearing alignment is well nigh impossible, even by severe blows, careless installation, or the heavy continuous radial loads some industrial drives impose. Notice, too, how Tri-Clad double-end ventilation provides uniform "air conditioning" throughout the motor.

You can trust a **TRI CLAD** motor to take abuse

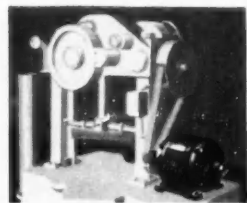
Teeth-rattling blows—accidental jarring—dripping liquids—they're all in a day's work for a Tri-Clad motor—the toughest general-purpose motor that hard-headed plant management can buy.

The cast iron structure which today protects more than a million and a half Tri-Clad motors, is one big reason for its stamina. It absorbs the shock of accidental blows and falling objects encountered in rigorous industrial service. It provides vastly superior resistance to rust and corrosion. Moreover, cast iron won't take on an injurious permanent "set"; thus it assures accurate shaft alignment and a permanent air-gap for the life of the motor. Thick-ribbed cast-iron end shields, too, take more than their share of punishment.

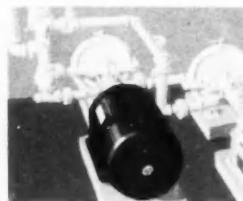
Want to standardize on a line of motors that can really **TAKE ABUSE**? Local stocks of Tri-Clad motors in your area mean **QUICK DELIVERY**. Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

GENERAL  **ELECTRIC**
740-11

YOU CAN'T BEAT
TRI CLAD
REG. U.S. PAT. OFF.
EXTRA PROTECTION



G-E open (dripproof) induction motors for constant-load, constant-speed applications. From 1 to 2000 hp.



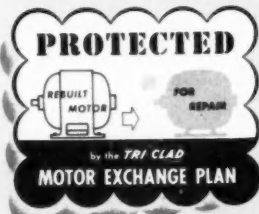
G-E totally enclosed motors for outdoor operation, in abrasive dusts, or corrosive fumes. From 1 to 1000 hp.



G-E vertical induction motors for pump drive, in streamline design. From 1 to 500 hp.



G-E capacitor motors for use on fans, blowers, pumps and compressors, with single-phase power. From $\frac{1}{4}$ to 5 hp.



Look for this **EXTRA** on the motor you buy!

1,250,000 miles... 00012¢ per mile transmission maintenance



Listen to what T. N. Busch, assistant superintendent, Woodlands Dept., International Paper Company, Georgetown, S. C., has to say about Fuller's economic contribution to the largest single paper mill in the world . . . producers of 1,350 tons of board per day. Mr. Busch says:

"We are using 10 Fuller Transmissions in our diesel trucks which have traveled a total of 1,250,000 miles. Our maintenance costs for these ten units amount to a total of \$150.00. We are very much satisfied with this performance, particularly as the trucks are used under

extremely heavy service involving on and off the road hauls of pulpwood."

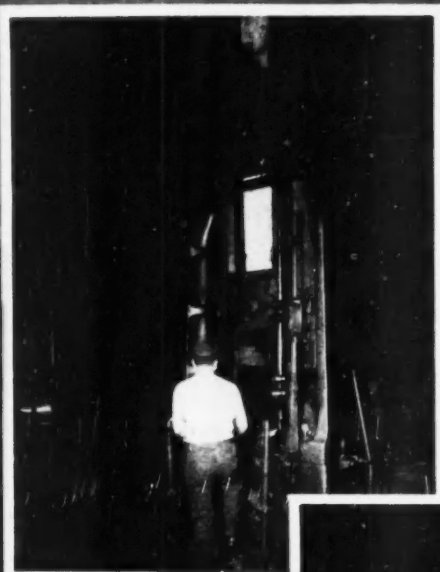
Kraft paper and board mills have made a very great contribution to the economic welfare of the South . . . Fuller Transmissions have made a similar contribution to the largest of these mills, the International Paper Company.

Fuller Transmissions and Auxiliaries are built for long wear-life . . . for maximum road service without costly, time-consuming overhauls. In addition, Fuller Transmissions offer the advantages of easy shifts and quiet operation. That's why fleet owners specify Fuller.

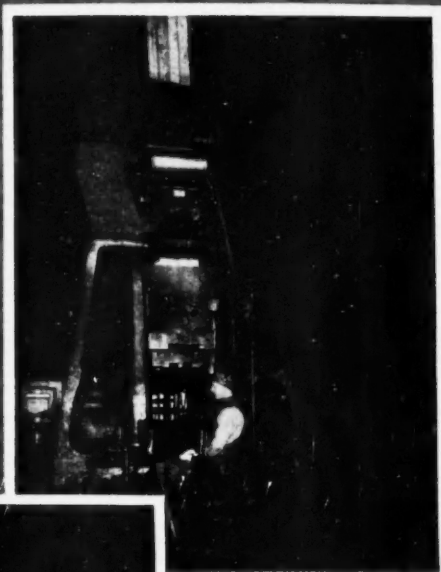


FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO 13F, MICHIGAN
Unit Drop Forge Division, Milwaukee 1, Wis. • WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1060 E. 11th Street, Oakland 4, Calif.

CHAMBERSBURG



**MODEL "F"
BOARD DROP HAMMER**
Unsurpassed for cutlery
and similar small forgings



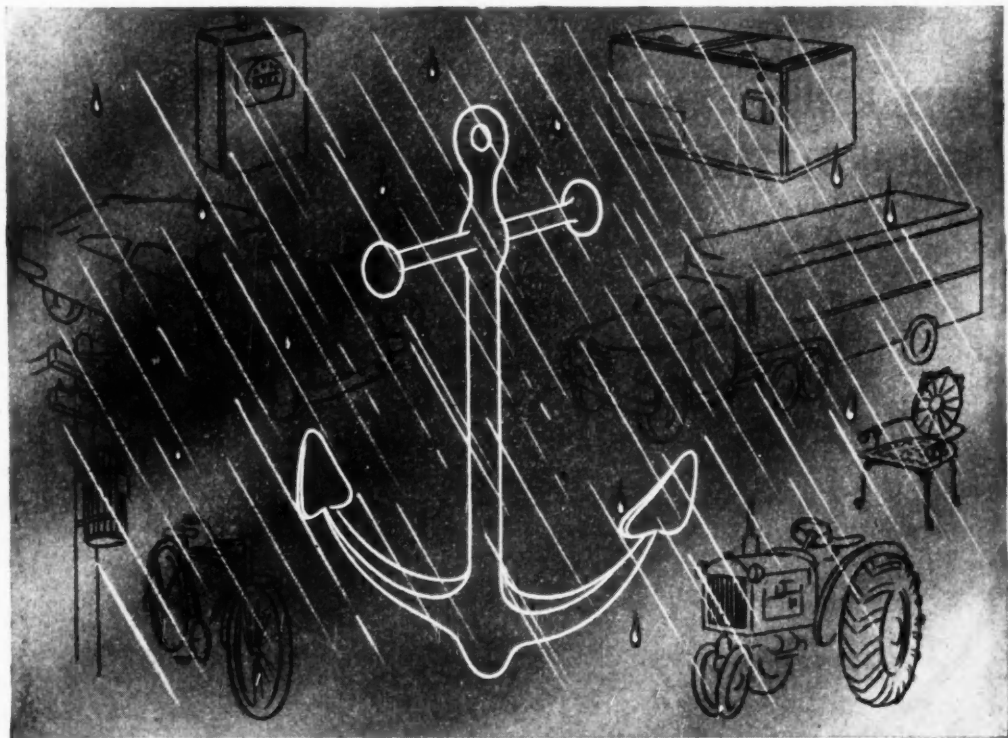
**MODEL "J-2"
BOARD DROP HAMMER**
The most productive
Board Drop Hammer



**CECO-DROP
PISTON-LIFT, GRAVITY DROP HAMMER**
The best Gravity Drop Hammer

GRAVITY DROP HAMMERS

Leaders in Their Respective Fields



BONDERITE...*an invisible anchor*

HOLDS PAINT TO METAL

After the paint's on, you can't see it. But the presence of that tight Bonderite layer under the paint means greater durability, longer life, and lasting good looks for the finish.

Bonderite acts in these three ways to protect and preserve paint finishes:

1. It anchors the paint.
2. It resists rust and corrosion.
3. It prevents the spread of paint failure around scratches and accidental breaks in the paint.

Because of its proved effectiveness and the ease and economy of the treatment for metal surfaces, Bonderite is used on thousands of quality products.

To add quality to *your* product, use Bonderite, the invisible anchor for fine paint finishes. Full information at once on request.

Bonderite, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

PARKER

PARKER RUST PROOF COMPANY
2178 East Milwaukee Ave.
Detroit 11, Michigan

BONDERITE—Corrosion Resistant Paint Base • PARCO COMPOUND—Rust Resistant • PARCO LUBRITE—Wear Resistant for Friction Surfaces

WHY REBUILD AND RE-UPHOLSTER SEAT CUSHIONS?

IT'S THRIFTY

TO REPLACE THEM WITH...



TRAVEL COMFORT CUSHIONS

According to a nationwide survey*, your seat cushions last about two and one-half years. Then, perhaps, you have them rebuilt. If you're like most fleet owners, you and your drivers usually find rebuilt seats an unsatisfactory make-shift.

Now, for the first time, you can replace them with brand new, expertly built Travel Comfort Cushions (seats and backs) for very near the cost of rebuilding your old ones — Cushions which are far superior in quality, comfort, service and satisfaction.

Whether you operate one truck or a hundred . . .

whether they're all alike or each a different model . . . McInerney will provide new cushions designed to fit your particular vehicle, made with a spring construction which has been scientifically developed and engineered specifically for truck use and expertly upholstered and tailored in your choice of upholstery materials and coverings.

Travel Comfort Cushions give you a better, longer-lived seating unit which will eliminate road shock, reduce riding fatigue, and provide greater comfort for your drivers.



WRITE FOR information about Travel Comfort Cushions . . . the easy, economical and satisfactory way to solve your seating problems.

TRAVEL COMFORT CUSHIONS

McInerney

*5000 Fleet owners and operators surveyed by Commercial Car Journal

SPRING & WIRE COMPANY

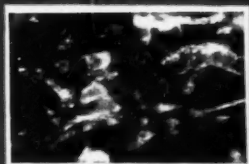
681 GODFREY AVENUE, S. W. • GRAND RAPIDS 2, MICHIGAN

NATIONAL OIL SEAL LOGBOOK

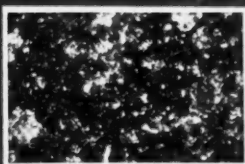
LEATHER vs. RUBBER OIL SEALS

There has been much controversy during the past ten years on the relative merits of leather vs. synthetic rubber for use in oil seals. In considering this subject, it should be remembered that performance of leather oil seals is limited to the inherent capabilities of the leather itself as a raw material, even granting improvements gained through various impregnation tanning and finishing processes. Synthetic rubber, on the other hand, can be especially compounded for the job, and is immune to many industrial chemicals which would deteriorate leather. Nevertheless, there is a place for both materials in the picture.

PHOTOMICROGRAPHS SHOW INHERENT DIFFERENCES



Leather subjected to wet abrasion shows pores which will absorb fluids, permit swelling and cause more friction and wear than the smooth shafts in which synthetic materials which operate at slower speeds, where torque is not a factor, or where seal may be subjected to severe intermittent dry.



Other photomicrographs show the smooth surface of synthetic rubber which is more uniform and less porous than leather. The synthetic rubber seal shown in the photograph is a per 2500 P. grade and 2.500 P. in size and size 2.500 indicator reading.

Given fine tolerance designing, expert manufacture and mirror-bright shaft finishes, either rubber or leather oil seals will perform well; but when machinery must be designed to broad tolerances and finishing is relatively rough, leather seals are generally more practical. Because leather sealing members are more resistant to abuse, they are recommended when service conditions are inexact, particularly where lubrication is apt to be neglected. When utilizing leather seals, the designer should consider the relatively greater torque.

Fundamentally, synthetic rubber oil seals are more resilient, withstand higher temperatures and create considerably less drag, while forming a near-perfect closure around moving shafts. Where torque is a

factor and high speeds are encountered—where run-out, shaft whip or eccentricity are extreme—where the machine is unusual or intricate—rubber seals are ideal.

In National Oil Seals, leather sealing members have been "Nationalized", a process which helps leather retain precise shape and size and also withstand heat. National synthetic rubber oil seals employ "Syntech*", which is specially compounded for use in seals.

National engineers are at your service to help you solve any oil sealing problem. For further information please contact nearest office.



In some applications it is good practice to use both leather and rubber oil seals—either separately or in combination—such as shown in the dual wipe seal at left.

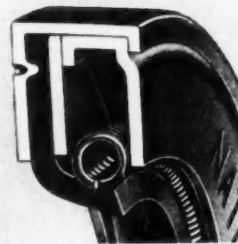
*Syntech is the registered trademark for the National synthetic rubber compound.

CALL IN A NATIONAL ENGINEER FOR RECOMMENDATIONS

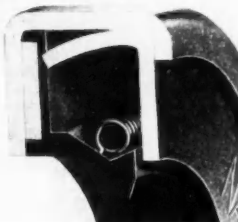
BUFFALO: 56 Arlington Place, Grout 2280
CHICAGO: Room 2014 Field Building, Central 4-8663
CLEVELAND: 210 Heights Rockefeller Bldg., Yellowstone 2720
DALLAS: 301 Highland Park Village, Justin 8-8453
DETROIT: Room 1026 Fisher Building, Trinity 1-6363
HOUSTON: 6731 Harrisburg Boulevard, Wayside 3-1246
LOS ANGELES: 2244 East 37th Street, Kimball 6384

MILWAUKEE: 647 West Virginia St., Marquette 8-8986
NEW YORK CITY: 122 East 42nd Street, Lexington 2-8260
PHILADELPHIA: 401 North Broad Street, Bell-Walnut 2-6997
REDWOOD CITY, CALIF.: Broadway and National, Emerson 6-3861
WEST SPRINGFIELD, MASS.: 1025 Elm Street, Springfield 2-1881
EAST SYRACUSE, N. Y.: 226 Roby Avenue, East Syracuse 366
WICHITA: 340 North St. Francis Ave., Wichita 2-6971

Which is better?
And when?



National spring-loaded leather seal



National spring-loaded Syntech* rubber seal

NATIONAL
OIL AND FLUID SEALS



NATIONAL MOTOR BEARING CO., INC.

General Offices: Redwood City, Calif.
 Plants: Redwood City and Los Angeles, Calif.; Van Wert, Ohio

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... And we are well-satisfied to bask in the reflected glory of the fine automobiles that have crossed the goal line of public acclaim.

The Standard Products Company, through close engineering cooperation and dependable production, has contributed at least one part to nearly every automobile on the highway today.

This is the family of PRODUCTS BY STANDARD that has earned the reputation for SUPERIOR QUALITY:

STEECHAN glass-run window channel . . . batwings and weatherstripping
. . . door locks, checks and remote controls . . . extruded or molded rubber parts and sections . . . molded thermo-plastics parts and accessories.

THE MARK OF A



SUPERIOR PRODUCT

The Standard Products Co.

EXECUTIVE OFFICES — 2130 W. 110th ST. CLEVELAND 2, OHIO

SALES OFFICES — 316 FISHER BLDG., DETROIT 2, MICH.

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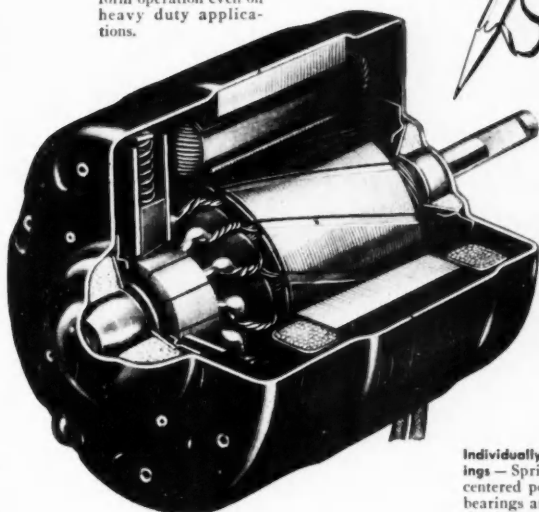
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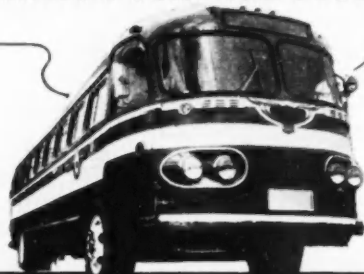


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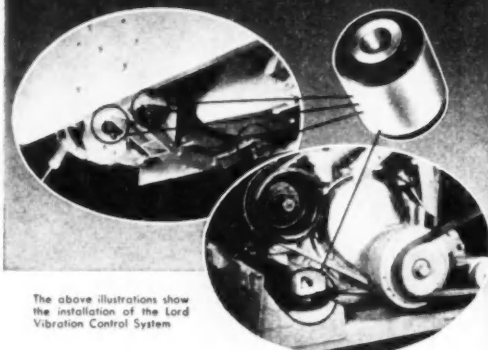


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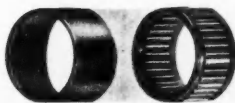
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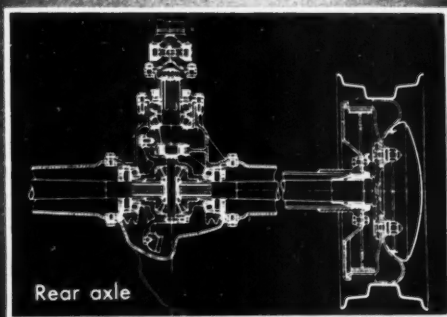
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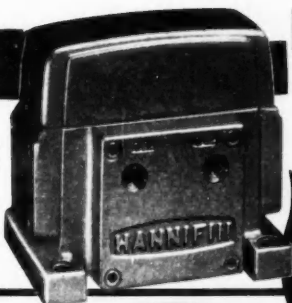
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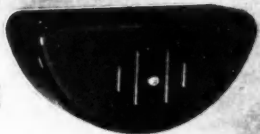
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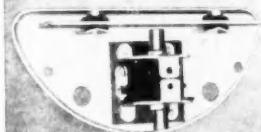
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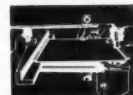
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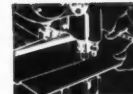
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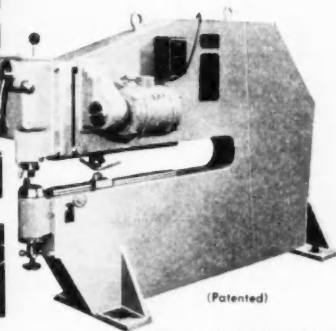
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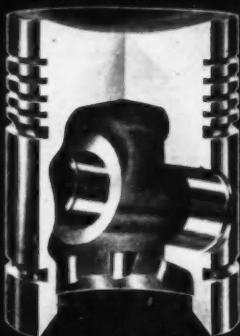
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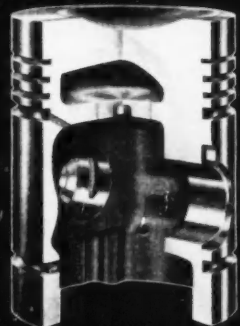
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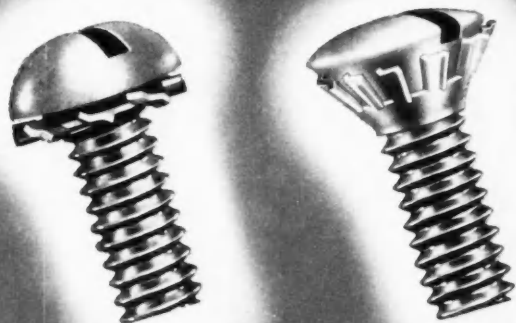
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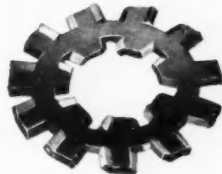
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